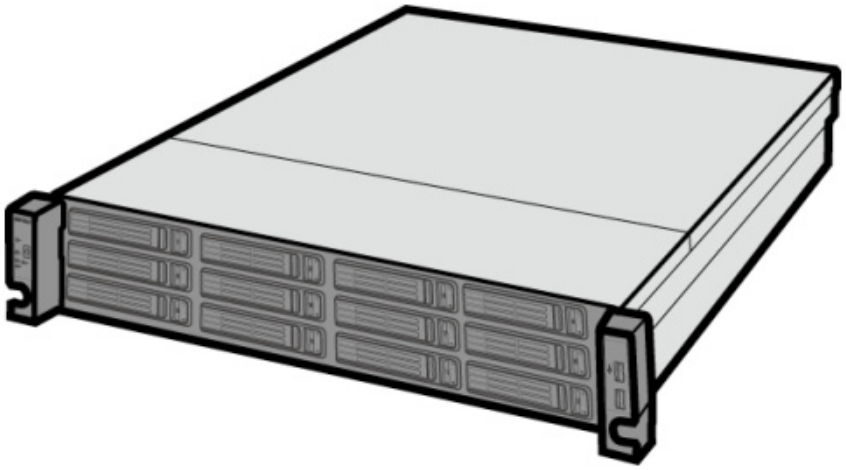
BUFFALO™

TeraStation 7000

User Manual



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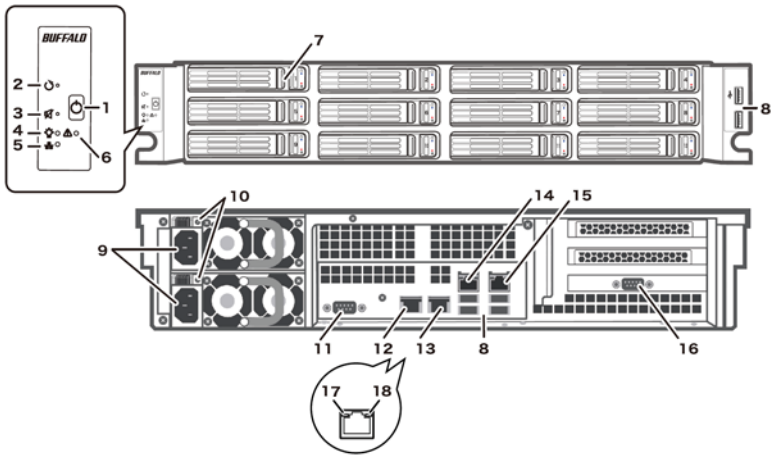
Chapter 1 Installation

Diagrams



1 **Power Button**
On: Press the power button to turn on the TeraStation.
Off: Press the power button twice within 3 seconds to turn off the TeraStation.

2 **Reset Button**
This resets the TeraStation. Use a toothpick or similar object to hold down this switch for a second, then release it.

3 **Mute Button**
This turns off audible alarms, such as the one you get when a power supply fails. Use a toothpick or similar object to hold down this switch for a second, then release it.

4 **Power LED**
This LED is on during normal operation. It blinks during boot and shutdown.

5 **LAN LED**
When any of the 4 LAN ports is connected to a network, this LED is illuminated green. The light to the right of the LAN port will be illuminated as well.

6 **Error LED**
If there is an error, the red error LED will light up. If there is an information, the red error LED will blink.

7 **Drive Lock**
Push the drive release to the left and swing out the lock to release the drive.

8 **USB 2.0 Port**
Compatible Buffalo USB hard drives, USB flash drives, digital cameras, and USB UPS connection can be connected.

USB hubs are not supported.

9 **Power Connectors**
Use the included power cables to connect these to a UPS, surge protector, or outlet.

10 **Power Status**
Glowing green: power is on
Blinking green: power is off
Glowing red: error
Blinking red: power supply fan error

11 **UPS Port**
Connect to a UPS.

12 **LAN Port 1**
Use an Ethernet cable to connect this port to your network.

13 **LAN Port 2**
This second Ethernet port may be used for network redundancy or backup. You may connect a TeraStation directly to this port for backup.

14 **LAN Port 3**
This third Ethernet port may be used for network redundancy or backup. You may connect a TeraStation directly to this port for backup.

15 **LAN Port 4**
This fourth Ethernet port may be used for network redundancy or backup. You may connect a TeraStation directly to this port for backup.

16 **VGA Port**

17 **Link LED**
Glows orange when the unit is connected to a 1000 Mbps network and green when the unit is connected to a 100 Mbps network.

18 **Act LED**
This LED shows network activity. It blinks orange when the TeraStation is accessed over the network.

Installation

1 Insert the TeraNavigator CD into your computer. TeraNavigator will launch.

2 Click *Begin Installation*.

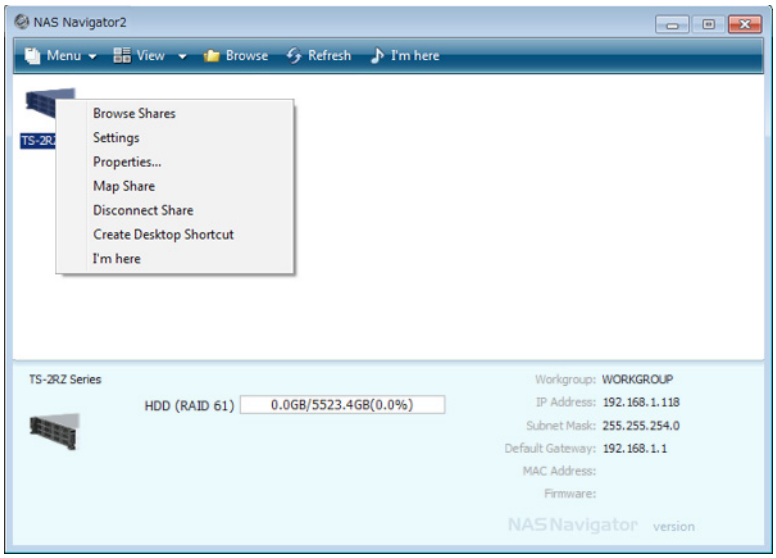
3 Follow the steps on the screen to connect the TeraStation's Ethernet and power cables and turn it on.

Note: Use LAN port 1 for initial setup. After setup, you may connect a second cable to LAN port 2. If you use LAN port 2, configure the IP address at *Network - IP Address* in Settings.

4 Follow the steps on the screen to install NAS Navigator2.

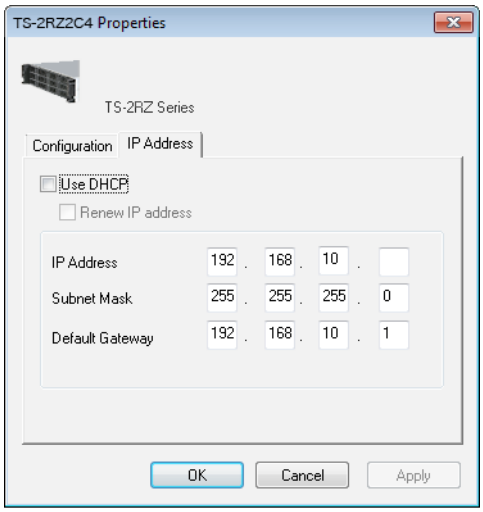
5 Click *Finish*. NAS Navigator2 will open.

6 Right-click on your TeraStation's icon and choose *Properties*.



Note: For Mac OS, select the TeraStation's icon while holding down the control key, then click *Configure*.

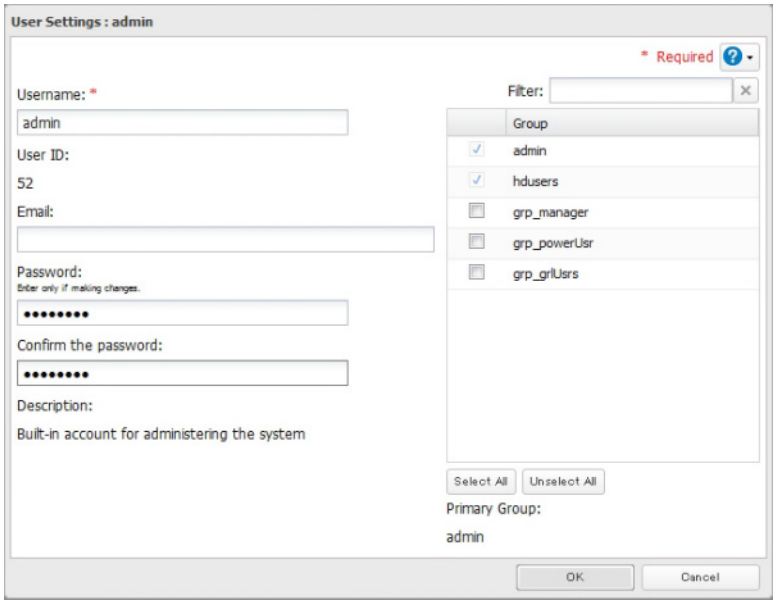
7 Click the *IP Address* tab, enter the desired settings, and click *OK*.



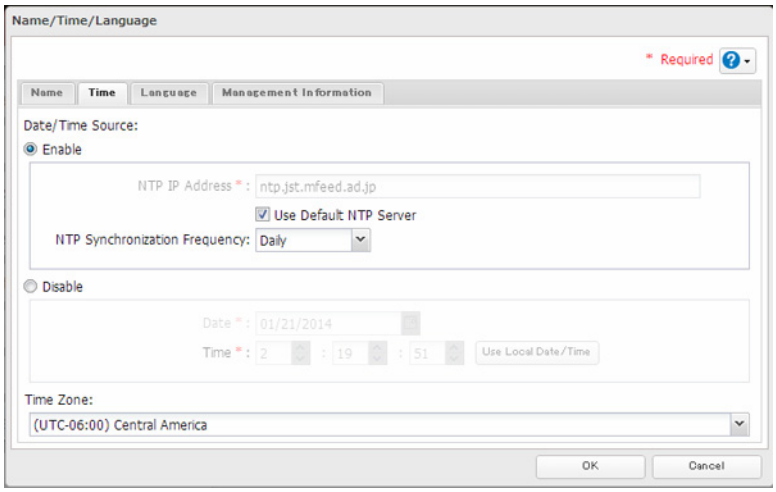
If you are prompted to enter the administrator password for the TeraStation, it is "password" by default.

8 Right-click on your TeraStation's icon and choose *Settings*.

9 Changing the password from the default in *File Sharing - Users - admin - Edit* is recommended.



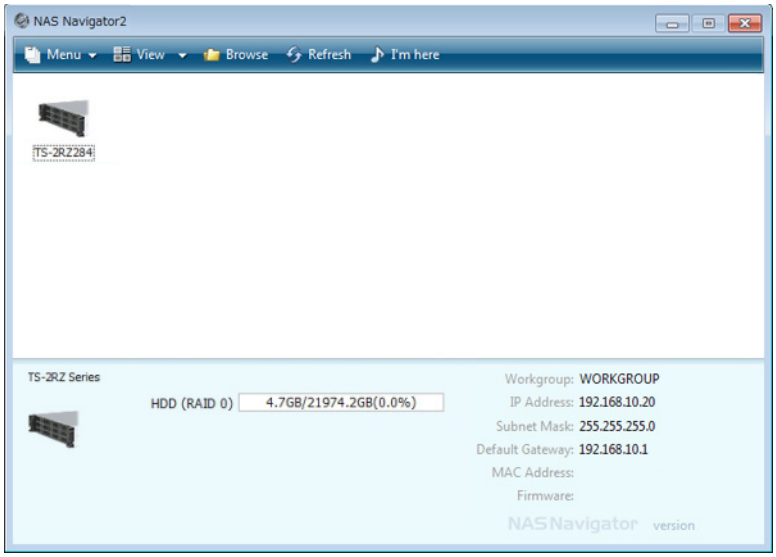
10 Go to *Management - Name/Time/Language* and configure the TeraStation's time and date.



Notes:

- For best results, use an NTP server to maintain the time settings on the TeraStation and other network devices. Clocks for the network devices may run at slightly different speeds. If these devices get out of sync it may cause network problems.
- Buffalo Technology is not responsible for any loss or damage caused by using the ntp.jst.mfeed.ad.jp service or service outages.
- If the TeraStation cannot automatically obtain the time from an NTP server, check its DNS settings. If the NTP server is specified by a hostname instead of an IP address, make sure that a DNS server address is configured in *Network - IP Address*.

11 In NAS Navigator2, double-click your TeraStation's icon. This will open the shared folder of the TeraStation. For Mac OS, the TeraStation is mounted as a drive icon on the desktop or displayed in the sidebar of the Finder. You can now use the TeraStation's shared folder to save files just like any other folder.



Turning the TeraStation On and Off

Press the power button on the TeraStation to turn it on.

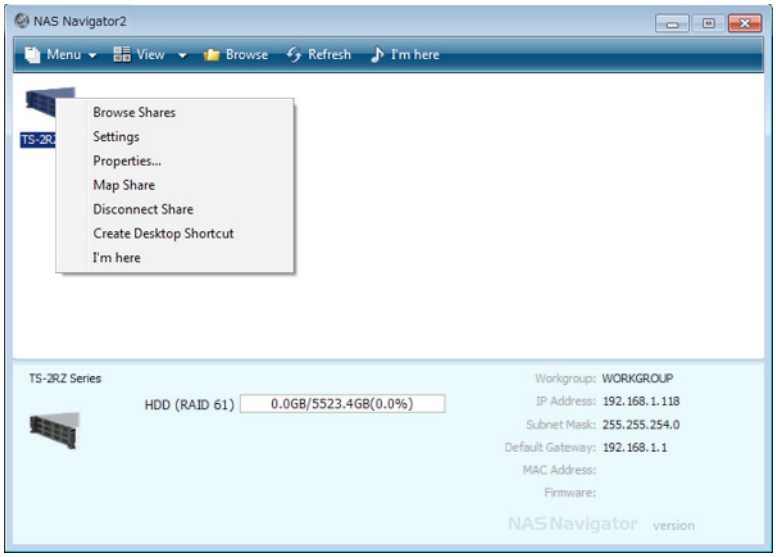
The TeraStation can be damaged if it is unplugged suddenly without powering it down properly. To shut down the TeraStation properly, press the power button twice within 3 seconds. Wait for it to turn completely off before

unplugging it. You can also shut it down and restart it remotely from Settings.

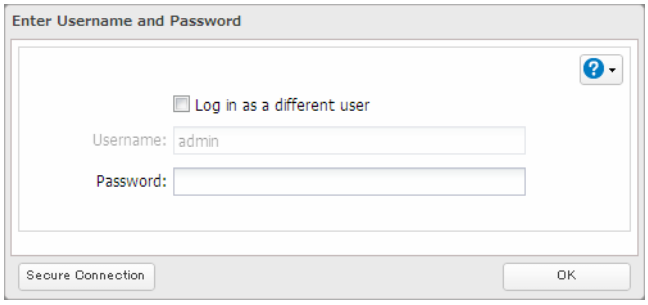
Shutting down or Restart from Settings:

1 Double-click the icon.

2 Right-click your TeraStation's icon and select Settings. For Mac OS, select the TeraStation's icon while holding down the control key, then select *Settings*.

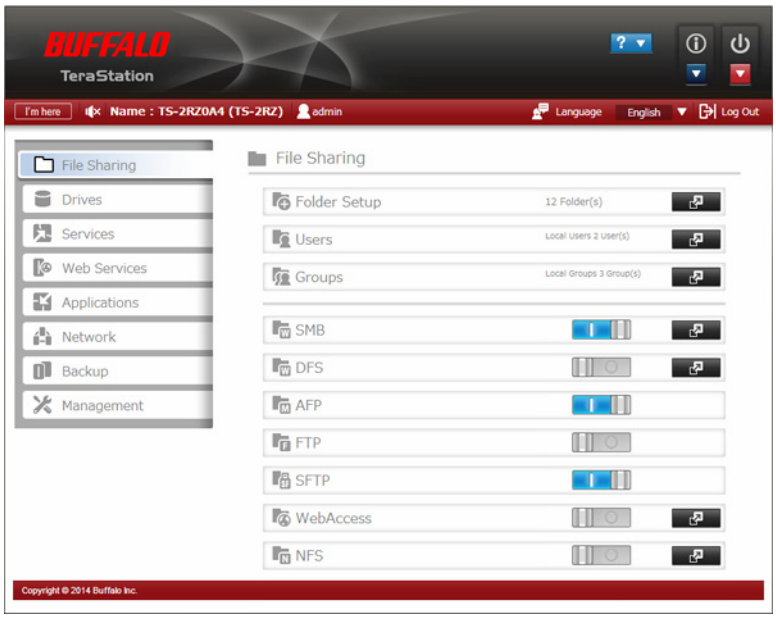


3 Enter the username and password, then click *OK*.

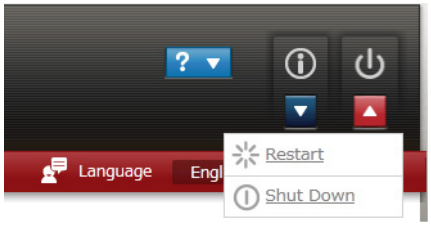


Note: The default username and password are "admin" and "password".

4 Settings will open.



5 Click at the top-right of Settings and choose either *Restart* or *Shut Down*.



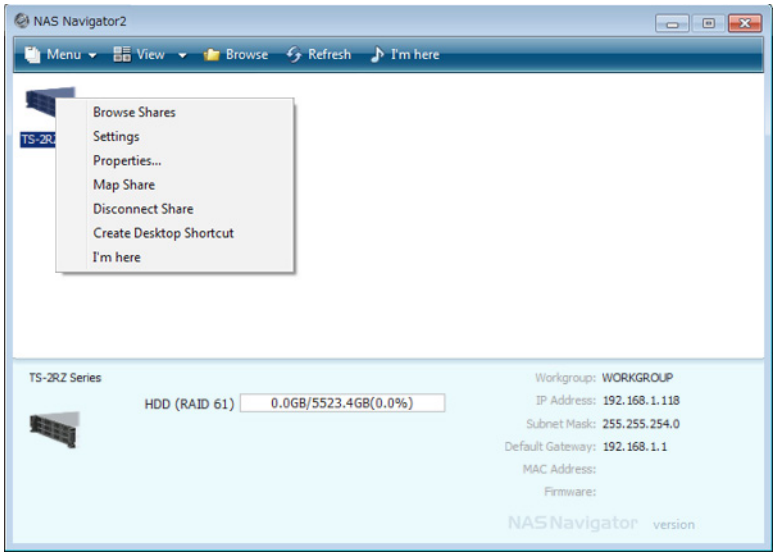
When all the LEDs on the front of the TeraStation turn off, the shutdown process is complete.

Changing the Administrator Password

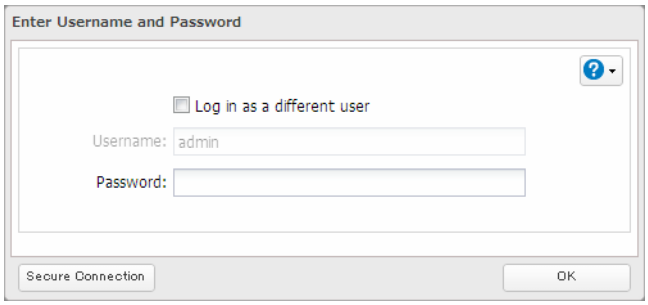
After initial setup, follow this procedure to change your password.

1 Double-click the icon. NAS Navigator2 will start.

2 Right-click on your TeraStation's icon and select Settings. On the Mac, select the TeraStation's icon while holding down the control key, then select *Settings*.



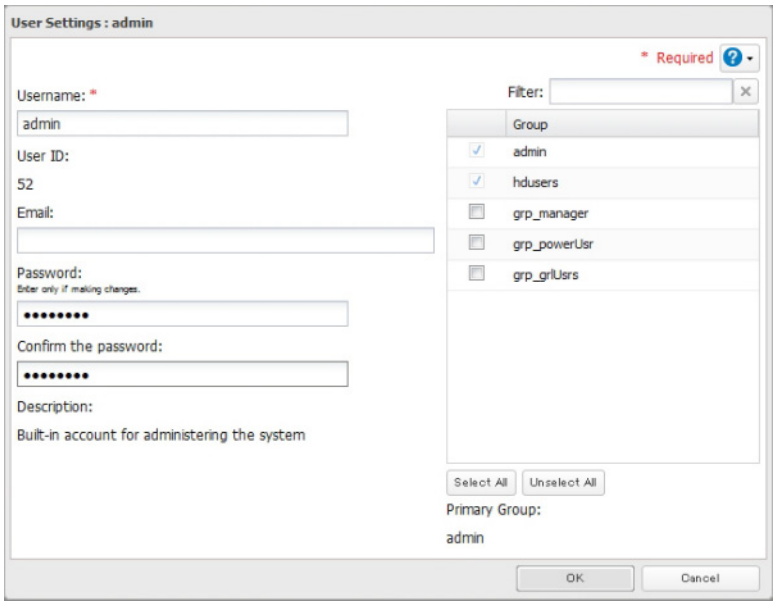
3 Enter your username and password.



4 In Settings, navigate to *File Sharing - Users*.

5 Click on *admin*.

6 Enter the new password (twice). Click *OK*. You have changed the admin password.



Recovery Drive

1. Insert a 1 GB or larger USB flash drive into a USB port on the TeraStation.

   Note: All data on the USB flash drive will be erased!

2. In Settings, navigate to *Management - Restore/Erase - USB Options*.

3. Select "Create a USB drive for system recovery".

4. Select the USB drive connected to the TeraStation from "Target USB drive", then click *Execute*. Enter the 4 digit confirmation number and click *OK*. The TeraStation will create the recovery drive. This will take about a minute.

5. When the "finished" dialog opens, the USB recovery drive is ready to use. Dismount the USB drive before unplugging it.

For the instructions on recovering the TeraStation using the drive you just created, turn to chapter 10.

Chapter 2 Configuration

Configure and administer your TeraStation using the Settings interface, accessible from a browser window. Open the interface using the procedure below or type the TeraStation's IP address in the URL field of your browser.

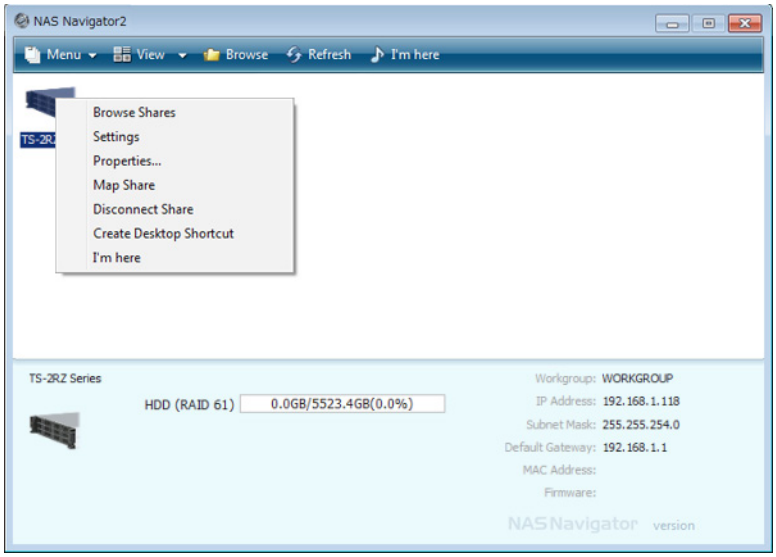
Note: Internet Explorer 9, Firefox 8, Google Chrome 15, Safari 5, and later are supported. If you have difficulty viewing Settings, check the following:

- If there are a large number of registered users, groups, or shared folders, use Firefox instead of Internet Explorer.
- If you have a proxy server enabled in the browser settings, disable the proxy server.
- With Internet Explorer, set security to *Local intranet*. On Windows Server 2008, higher-level security is configured by default. Set the security to a lower level temporarily.

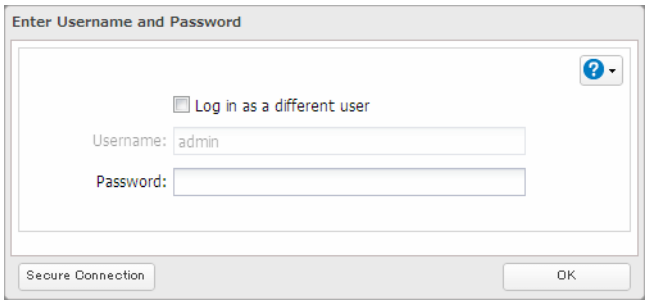
Opening Settings

1 Open NAS Navigator2 by double-clicking the icon.

2 Right-click on your TeraStation's icon in NAS Navigator and select *Settings*. For Mac OS, click your TeraStation's icon while holding down the control key, then select *Settings*.



3 Enter the username and password and click *OK*.



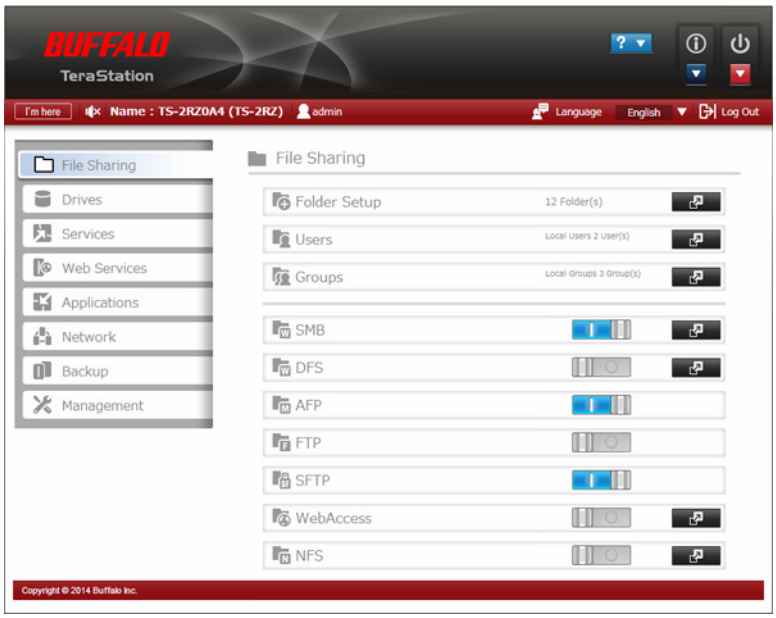
Username/Password Combinations:

Username	Password	Settings Available
admin	password	All
guest	blank	TeraStation's name (read-only)
your username	your password	TeraStation's name (read-only) and your password.

Notes:

- If the time-out period is set to "10 minutes", you will be logged out of Settings after 10 minutes of inactivity.
- Click *Secure Connection* to secure your login.

4 Settings will open.



Notes:

- Click I'm here to play a tone from the TeraStation for easy location. To stop the tone, click .
- You can also use Bonjour to log in to Settings from OS X 10.4 or later. In Safari, click *View* - *Show Bookmarks* bar. From Bookmarks, click *Bonjour* - *(TeraStation name)*.

Chapter 3 Access Restrictions

You may restrict access to specific shared folders, including external USB drives.

Notes:

- Access restrictions can be set separately for each shared folder, but not for folders within the shared folders.
- Configure access restrictions through Settings. Configuring access restrictions through Windows is not supported and may cause unexpected behavior.
- Shared folders with limited access can still be used as backup destinations.

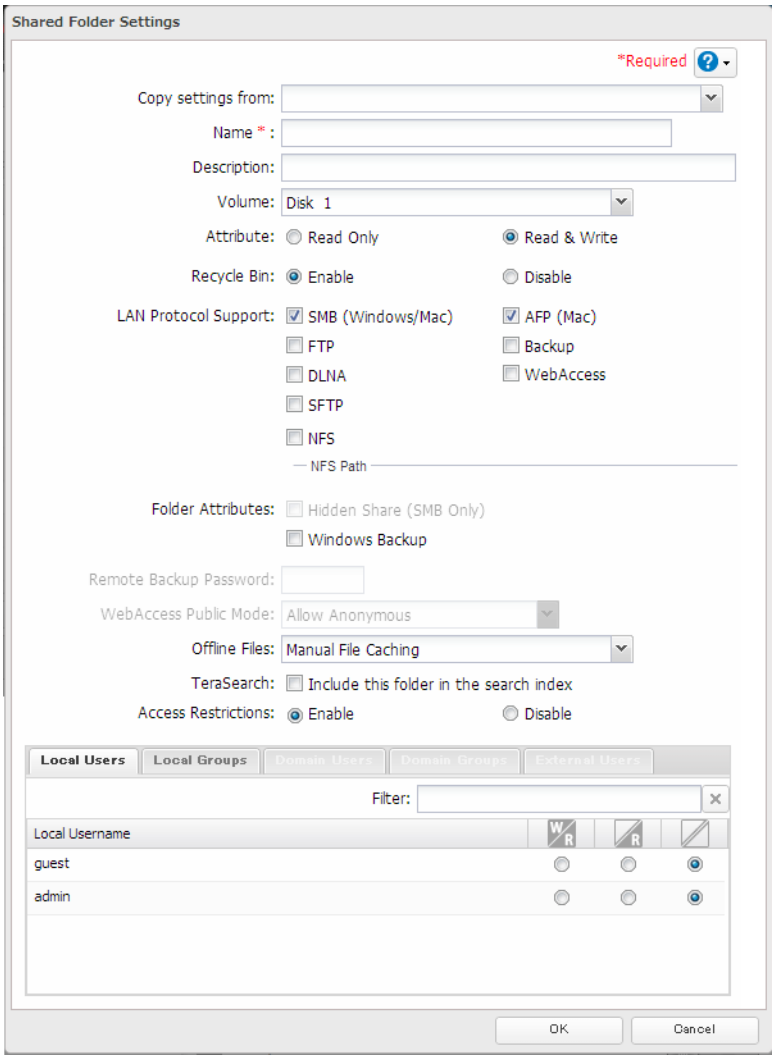
Configuring Access Restrictions on Users and Groups

Adding a Shared Folder

1 In Settings, click the icon to the right of "Folder Setup".

2 Click *Create Folder*.

3 Configure the desired settings, then click *OK* at the bottom of the window.



Notes:

- Names may contain up to 27 alphanumeric characters, hyphens (-), and underscores (_). Do not use a symbol as the first character in a name.
- The description may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a space as the first character.
- You may create up to 400 shared folders.
- The names of shared folders should not use characters from more than one language. For example, mixing Japanese and Korean characters in names is not supported.
- If multi-byte characters are used in shared folder names, configure the client language to match the characters in *Management - Name/Time/Language*.

Recycle Bin

To protect your data from accidental deletion, you may configure your TeraStation to use a recycle bin instead of deleting files immediately. The recycle bin will only work with SMB connections. To empty the recycle bin, click *File Sharing - Folder Setup - Empty the recycle bin* in Settings.

Accounts

Your TeraStation username and password should be the same as your Windows username and password. If they are different, you may not be able to access folders on the TeraStation with access restrictions configured.

Read-only Shares

By default, new shares are set with read & write access, but you may change the attribute to *Read-only* in *Shared Folder Attributes*. Read-only shares and HFS+ formatted USB hard drives will have "Read-only" added to the shared folder description.

Hidden Shares

To hide a shared SMB folder, select "Hidden Share (SMB Only)" and click *OK*. To open a hidden folder, click *Start - Search programs and files* and enter "\\TeraStation name\Shared folder name$\" for the name. Example: If the TeraStation name is "TS-XX001" and the shared folder name is "share", then enter "\\TS-XX001\share$\" to open it.

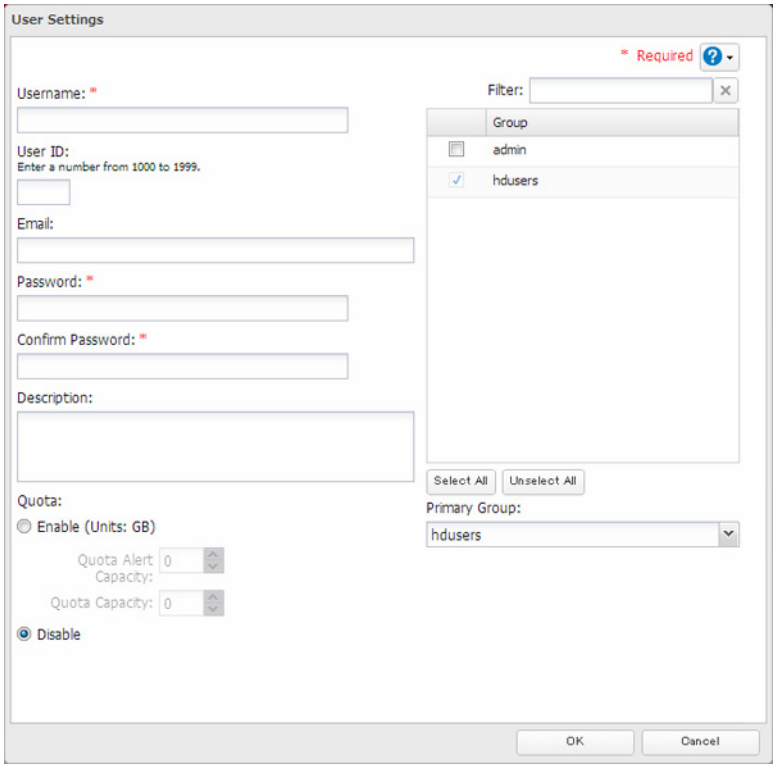
Note: FTP, SFTP, Mac AFP, WebAccess, and NFS folders cannot be hidden.

Adding Users

1 In "File Sharing", select *Users*.

2 Click *Create User*.

3 Enter the desired settings, then click *OK*.



Notes:

- Usernames may contain up to 224 characters, including hyphens (-), underscores (_), periods (.), !, #, &, @, $, *, ^, and %. Do not use a symbol as the first character.
- For Windows 8.1 or Windows 8, use a local username instead of your Windows Live ID.
- The user ID should be a number from 1000 to 1999. Each user ID should be unique. If this field is left blank, a user ID is assigned automatically.
- Do not duplicate user IDs, group IDs, usernames, or group names. Each should be distinct and unique.
- The description may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a space as the first character.
- When users are given access privileges, a maximum of 300 users, including "admin" and "guest", can be registered in the TeraStation.
- Passwords may contain up to 20 alphanumeric characters and the following characters: - _ @ ! # $ % & ' ( ) * + , . / ; < > = ? "] ^ { } | ~. Do not use a symbol other than an underscore (_) as the first character.
- Use the same username and password for both Windows and the TeraStation or you may not be able to access shared folders.

Importing User Information

You can import users in *File Sharing - Users* by clicking *Import CSV File*. Note that existing users will be overwritten.

Format for user data: Username (required), password (required), and user description (optional).

Examples:

username1,password1,comment1

username2,password2,comment2

username3,password3,comment3

Guidelines:

- Use commas (,) as separators. Do not put spaces before or after commas.
- If a line has an incorrect format, the user on that line will not be registered.
- If a username exists, the new user information will overwrite the old information.
- Do not use commas (,) in the username, password, or user description. .

  Note: Importing users may take some time. During import, other operations in Settings may be much slower than usual.

Shared Folder Owners

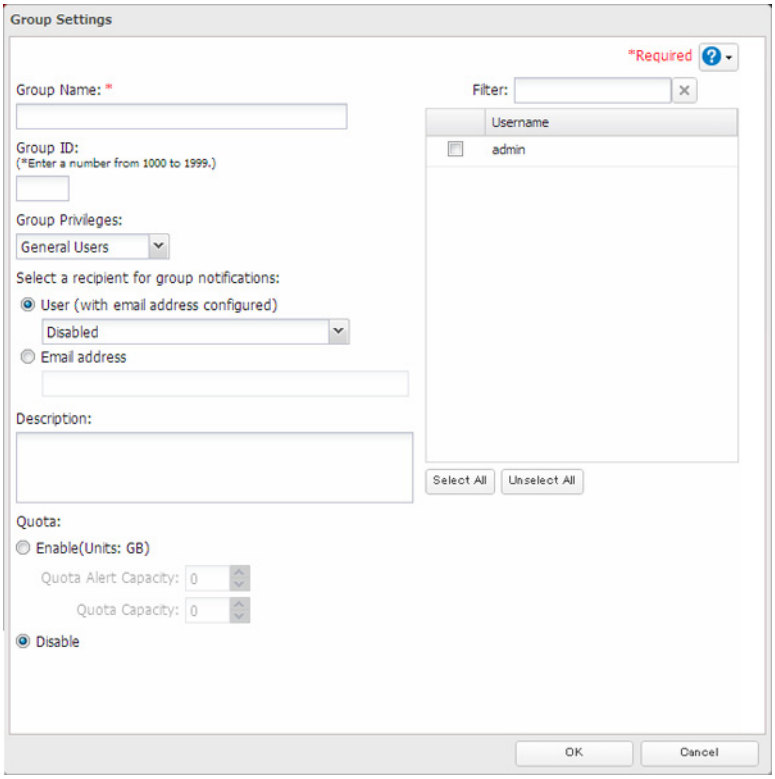
To confirm the owner of a shared folder from Windows XP from the *Properties* screen of the file or folder, open a new window from the *Security* tab. Click *Advanced*, then click the *Owner* tab.

Adding Groups

1 In "File Sharing", select *Groups*.

2 Click *Add Group*.

3 Enter settings, then click *OK*.



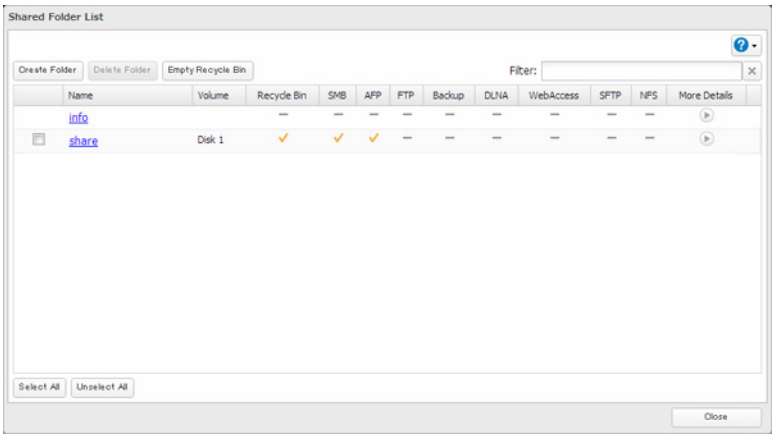
Notes:

- Group names may contain up to 224 alphanumeric characters, hyphens (-), underscores (_), and periods (.). Do not use a symbol other than an underscore (_) as the first character.
- Group descriptions may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a symbol or space as the first character.
- If the group ID field is left blank, a group ID is automatically assigned. Use numbers between 1000 and 1999 to set a group ID manually. Don't use duplicate group IDs.
- You may register up to 300 groups with the TeraStation.
- If you are logged in as a member of the general users group, you can only change your own password. If you're logged in as an administrator, you can change any settings, including other user's passwords. If you are logged in as a member of the power users group, you can create and edit shared folders, users, and groups.
- Do not duplicate user IDs, group IDs, usernames or group names. Each should be distinct and unique.

Access Restrictions

1 In "File Sharing", select *Folder Setup*.

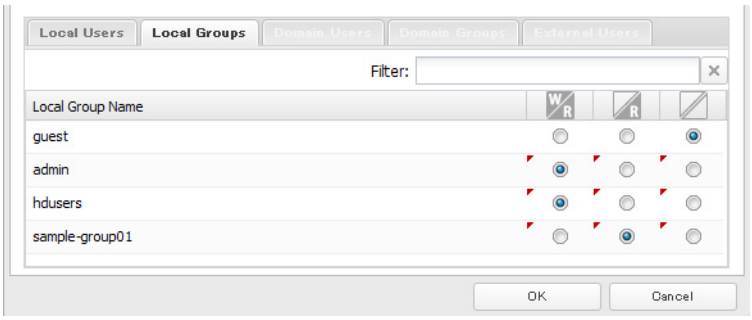
2 Click the shared folder that you want to set access restrictions for.



3 Click *Edit*.

4 Enable "Access Restrictions".

5 Select the level of access for the user or group you added.
: Read and write access allowed : Read access allowed : Access prohibited



6 Click *OK*.

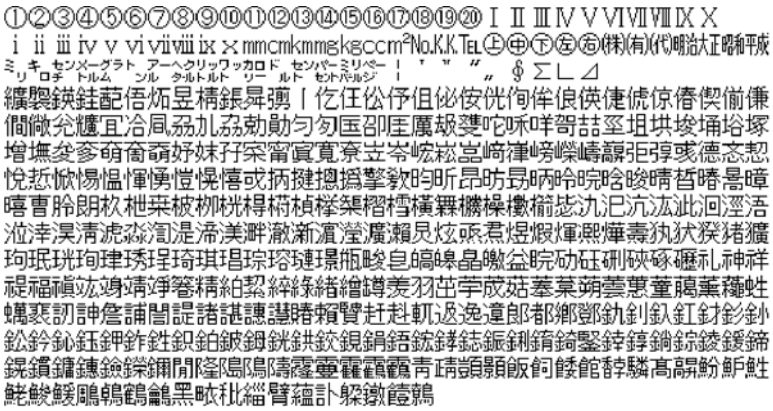
Notes

- The example above shows access restriction by user. To restrict access by group, click the *Local Groups* tab and select group permissions.
- If both read-only and read & write permissions are given to a user, the user will have read-only access. The most restrictive access always applies.
- The following characters are handled differently by Mac OS and Windows. Avoid using these characters when sharing data between Mac OS and Windows: ¯ ~ ¥ ¦ ¢ £ ¬
- Windows does not support some characters that Mac OS and the TeraStation allow. If you create a filename on a Mac with any of the following characters, it will not display correctly on a Windows computer. With OS X 10.2 or later, you may have to connect to the TeraStation via AFP in order to display or copy any of the following characters.

  ?] / \ = + < > ; : " , | *
- Do not use any of the following words as a username or group name: root, bin, daemon, sys, adm, tty, disk, lp, sync, shutdown, halt, operator, nobody, mail, news, uucp, ftp, kmem, utmp, shadow, users, nogroup, all, none, hdusers, admin, guest, man, www, sshd, administrator, ftpuser, apache, mysql, splx
- Do not use any of the following words as the name of a shared folder. These words are reserved for internal use by

the TeraStation: info, spool, lost+found, global, printers, homes, lp, authtest, ram, msdfs_root, mt-daapd, usbdisk# (where # is a number, for example: usbdisk1)

- Don't use the following unsupported characters in shared folder names, workgroup names, or filenames:



- File and folder names may contain up to 255 single-byte characters.
- Configure hidden and read-only file attributes in Settings. Configuring them from within Windows is not supported and may cause unexpected behavior.
- Folder and workgroup names whose names contain non-Roman characters may not be displayed correctly.
- If shared folders are accessed from a Macintosh, information files for the Macintosh may be generated automatically. Do not delete these files. If they are deleted using Windows, this may prevent further access from a Macintosh.
- If an SMB connection is used with OS X 10.3.9, the names of mounted volumes may appear as unreadable characters in Finder and other applications. This is not a problem with the filename or data.
- With OS X 10.5 to 10.5.6, Spotlight searches are not supported over AFP connections. Use SMB connections or upgrade to OS X 10.5.7 or later.
- The TeraStation belongs to the default zone in AppleShareServer; the zone cannot be specified.
- When files are copied to the TeraStation or to a USB drive connected to the TeraStation, file information such as date created, date modified, and other date information may be updated or changed.
- Hard drive capacity is shown in Settings in actual gigabytes. The Properties window in Windows may show GiB instead, which will be a smaller number.
- During a file transfer, if settings are changed, the file transfer operation may be aborted.
- File copying to the TeraStation is protected by a journaling file system.
- If the Ethernet cable is disconnected or a power outage occurs while copying data, the following may occur:

  - The preset data (TeraStation name, user, and group) may be erased.

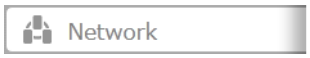
  - An incomplete file may be copied and the file can no longer be deleted. If this happens, restart the TeraStation, delete the file, and perform the copy operation again.
- After a drive is formatted, the "% Used" and "Amount Used" in Settings will not be 0. This is because some drive space is used for the system area.

Active Directory

The TeraStation can join an Active Directory domain. Up to 1000 domain users and 1000 groups may be downloaded from Active Directory.

Note: If usernames or group names from Active Directory include multi-byte characters, you will not be able to configure access restrictions for them.

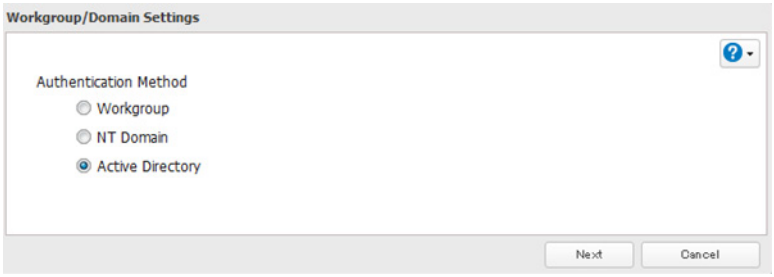
1 In Settings, select *Network*.



2 Select *Workgroup/Domain*.

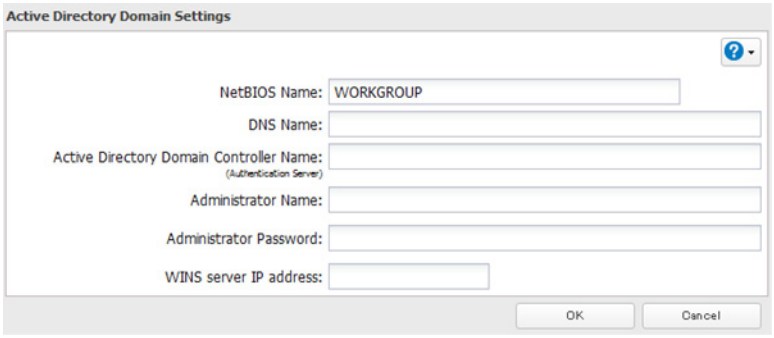
3 Click *Edit*.

4 Select "Active Directory", then click *Next*.



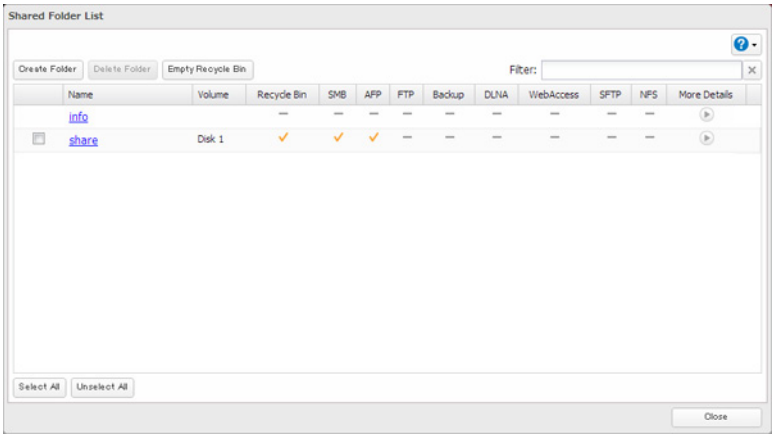
5 Click *Yes*.

6 Enter the desired settings, then click *OK*.



7 Choose *Folder Setup*.

8 Click a shared folder that you want to set access restrictions for.



9 Click *Edit*.

10 Enable "Access Restrictions".

11 Select the level of access for the user or group:
: Read and write access allowed : Read access allowed : Access prohibited

12 Click *OK*.

Notes:

- To have the TeraStation join an Active Directory domain, configure it to use a DNS server that can resolve names for the Active Directory domain.
- After building an Active Directory domain, the administrator password for joining the domain must be changed at least once, or joining the Active Directory domain will fail.
- The DNS name and NetBIOS name of Active Directory domains should be identical.
- If both read-only and read & write permissions are given, the user will have read-only access. The most restrictive access setting will apply.
- If there are more than 5 minutes difference between the TeraStation's clock and the domain controller's clock, joining the domain or authenticating domain users and groups may fail. For best results, use an NTP server to set the time for all network devices.
- The TeraStation supports a domain environment with a maximum of 1000 users and 1000 groups. 10,000 users and 10,000 groups can be downloaded from the domain controller but are not supported.
- To use the TeraStation as a member server in an Active Directory domain, the TeraStation should be logged in to the domain and accessed from a computer that is not a member of the domain with a valid domain account.
- If the TeraStation is a member server of an Active Directory domain, you cannot connect as a guest user via AFP.
- If your TeraStation is a member server in an Active Directory domain and you change the authentication method to "Workgroup", the account on the domain controller will not be deleted automatically.
- AFP connection will not be possible while using Active Directory and access restrictions. Use SMB or FTP instead.

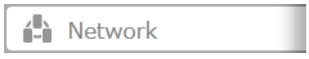
NT Domains

In an NT domain environment, the TeraStation uses account information from the NT domain server to set access restrictions for files and folders on the TeraStation. There's no need to perform individual account management for the TeraStation. If multiple TeraStations are installed on the network, the account information is centrally managed in the NT domain, greatly reducing the operations required for installation and management.

Note: A maximum of 1000 domain users and 1000 groups can be downloaded from an NT domain server.

1 Create an account on the domain controller for the TeraStation.

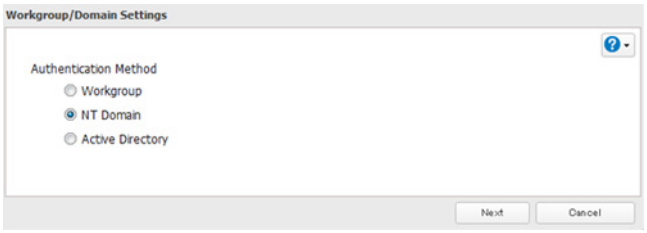
2 In Settings, click *Network*.



3 Select *Workgroup/Domain*.

4 Click *Edit*.

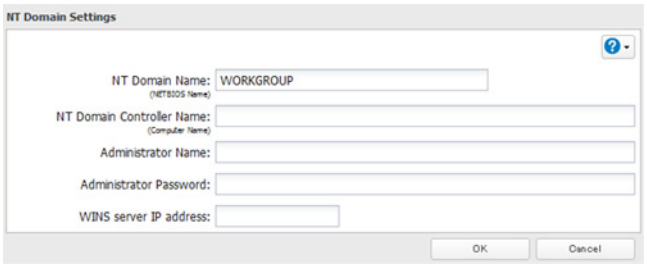
5 Select "NT Domain", then click *Next*.



Note: To use Active Directory from Windows 2000 or Windows Server 2003, select "Active Directory" instead of "NT Domain".

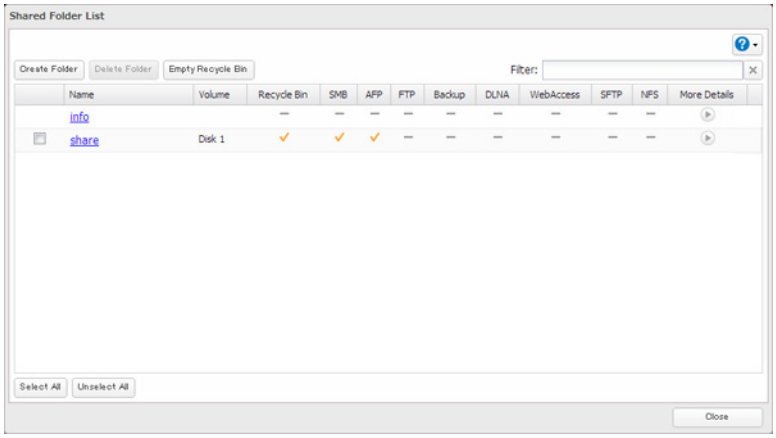
6 Click *Yes*.

7 Enter settings and click *OK*.



8 Click to the right of "Folder Setup".

9 Click a shared folder for which you want to set access restrictions.



10 Click *Edit*.

11 Enable "Access Restrictions".

12 Select the level of access for "Domain Users" or "Domain Groups" you added.

: Read and write access allowed : Read access allowed : Access prohibited

13 Click *OK*.

Notes:

- If you change the TeraStation's name, you will no longer be able to use domain users and groups or access restrictions. To repair this, rejoin the domain.
- If both read-only and read & write permissions are given to a user, the user will have read-only access. The most restrictive access is used.
- If a domain username is more than 20 bytes long (20 single-byte characters), the TeraStation truncates it to 20 bytes.
- The TeraStation supports a domain environment with a maximum of 1000 users and 1000 groups. 10,000 users and 10,000 groups can be downloaded from the domain controller but are not supported.
- To use the TeraStation as a member server in an NT domain, the TeraStation should be logged in to the domain and accessed from a computer that is not a member of the domain with a valid domain account.
- If the TeraStation is a member server of an NT domain, you cannot connect as a guest user via AFP.
- When you change the user or group settings on the domain controller, these changes may not take effect immediately on the TeraStation until it is rebooted.
- If your TeraStation is a member server in an NT domain and you change the authentication method to "Workgroup", the account on the domain controller will not be deleted automatically.
- If the TeraStation has joined a domain network, you cannot connect to it via FTP.

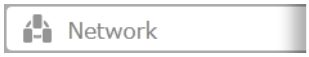
Delegating Authority to an External SMB Server

TeraStations on your network can be linked to an authentication server for centralized management of user accounts and passwords. The authentication server should be a LinkStation or another TeraStation.

Notes:

- Other external SMB authentication servers are not supported. Use a TeraStation or a LinkStation for the authentication server.
- When saving changes to the external authentication server settings, clicking *Yes* will convert all local users to external authentication users. If external authentication is disabled, local user passwords will need to be reconfigured.
- Disable SMB2 before using external authorization with Windows 8.1, Windows 8, or Windows 7.
- Using external authentication may require the default security settings in Windows to be changed. An easy way to do this is to run the File Sharing Security Level Change Tool, available from www.buffalotech.com. This simple tool will let you change or restore your Windows security settings to work with external authentication.

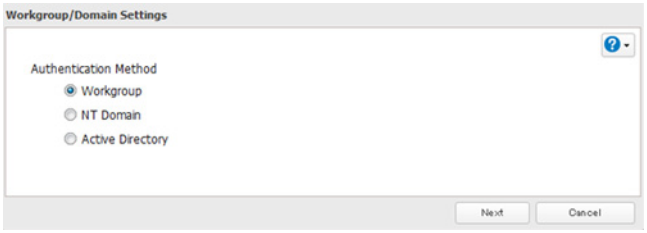
1 In Settings, click *Network*.



2 Choose *Workgroup/Domain*.

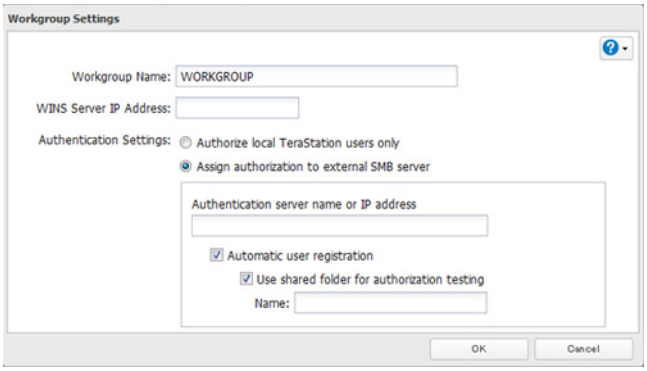
3 Click *Edit*.

4 Select "Workgroup", then click *Next*.
To use in a domain environment, select "NT Domain" or "Active Directory".



5 Click *Yes*.

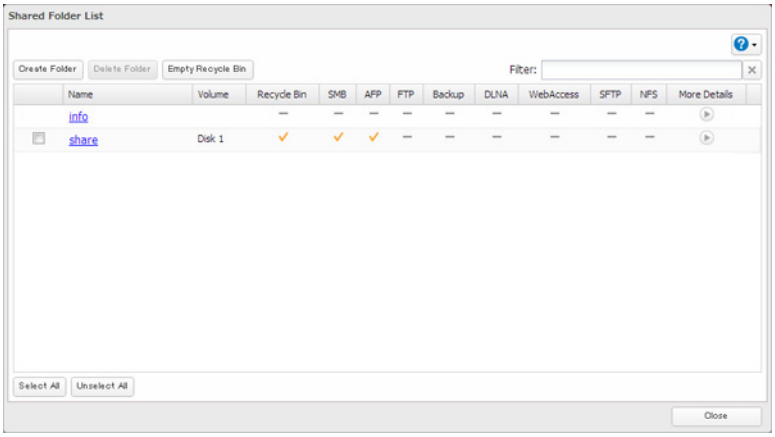
6 Enter a workgroup name. Select "Assign authorization to external SMB server" and enter the authentication server's IP address (recommended) or name. Check "Automatic user registration" and "Use shared folder for authorization testing", and enter the name of the folder to use. Click *OK*.



7 A shared folder for authentication will be created on the TeraStation. Users registered to the authentication server are automatically registered as users on the TeraStation when they open the shared folder for authentication. You can also register users directly. Connect to the authentication folder via SMB, not FTP or AFP.

8 Choose *Folder Setup*.

9 Choose a shared folder to set access restrictions on.



10 Click *Edit*.

11 Enable "Access Restrictions".

12 Select the level of access:
: Read and write access allowed : Read access allowed : Access prohibited

13 Click *OK*.

Notes:

- If access restrictions are set for users or groups from the authentication server, guest and anonymous connections will not be possible with AFP or FTP connections.
- Users who are automatically registered belong to the "hdusers" group. They can be added to other groups from within group settings.
- If both read-only and read & write permissions are given to a user, the user will have read-only access.
- The names of registered users are listed in "Users" - "External Users". To delete a user who was registered automatically, select that user and click *Delete External User*.
- When connecting through AFP or FTP, always use an IP address. Using a server name may cause problems with authentication.
- To specify a server from another subnet, enter its IP address.
- Use AFP to access-limited shared folders from OS X 10.7 instead of SMB. Enable "AFP (Mac)" under "LAN Protocol Support" on the destination folders to use AFP.
- Use OS X 10.5 or later for use with external authentication. Earlier versions of OS X aren't supported.

Chapter 4 Managing Storage

RAID Arrays

TeraStations support many types of RAID. The type of RAID arrays available for use depends on how many drives are installed in your TeraStation.

Notes:

- If you change the RAID mode, all data on the array is deleted. This is true for every procedure in this chapter. Always back up any important data before performing actions that affect your RAID.
- After the RAID mode is changed (except when creating a RAID 0 array or JBOD), the TeraStation performs a RAID check that will take about 10 hours per TB. File transfers are slower during this period. While the message "RAID I20 DISKx Formatting" is displayed in NAS Navigator2, do not turn off the TeraStation. If you do, the RAID check starts over.
- If the TeraStation is restarted or shut down while changing the RAID mode, the message displayed in NAS Navigator2 will change from I46 or I47 to I18.

JBOD

This mode uses the hard drives inside the TeraStation as individual drives. The disk space you can use is the total capacity of all drives in the TeraStation. If any drive is damaged, then the data on that drive is lost.

RAID 6

RAID 6 arrays are available for TeraStations with 4 or more hard drives. RAID 6 combines 4 or more drives into a single array. The usable space is equal to the sum of the capacity of all drives minus the capacity of two drives. For example, if 4 drives are combined into a RAID 6 array, the usable spaces the sum of the capacity of 2 drives. If 2 drives in the array are damaged, you can recover data by replacing them. If 3 or more drives are damaged, your data is lost.

RAID 61

RAID 61 arrays are available for TeraStations with 8 or more drives. In this mode, two RAID 6 arrays are mirrored in a RAID 1 array. 8 drives in a RAID 61 array have a usable capacity of 2 x the capacity of the smallest drive.

RAID 5

RAID 5 arrays are available for TeraStations with 3 or more hard drives. RAID 5 combines 3 or more drives into a single array. The usable space is equal to the sum of the capacity of the hard drives minus the capacity of one drive. For example, if 4 drives are combined into a RAID 5 array, the usable space is the sum of 3 drives. If one drive in the array is damaged, you can recover data by replacing the damaged drive. If two or more drives are damaged at the same time, your data is lost.

RAID 51

RAID 51 arrays are available for TeraStations with 6 or more hard drives. In this mode, two RAID 5 arrays are combined into a RAID 1 array. The total usable space for 6 drives in a RAID 51 array is 2 x the capacity of the smallest drive. For 8 drives, the total usable capacity is 3 x the capacity of the smallest drive.

RAID 10

RAID 10 arrays are available for TeraStations with 4 or more hard drives. In this mode, mirrored pairs of drives in RAID 1 arrays are combined into a RAID 0 array. The usable space is equal to the capacity of the smallest drive multiplied by the number of hard drives divided by 2.

RAID 1

Combines 2 drives into a mirrored array. The available space in the array is the capacity of a single drive. Identical data is written to each drive. If a drive is damaged, data can be recovered by replacing the damaged drive. As long as one drive in the array remains undamaged, all data in the array can be recovered.

RAID 0

Combines 2 or more hard drives into a single array. The usable disk space is the total space of all drives used. This simple RAID mode offers faster performance than RAID modes that include parity. If a single drive in the array fails, then all data in the array is lost.

Working with RAID Arrays

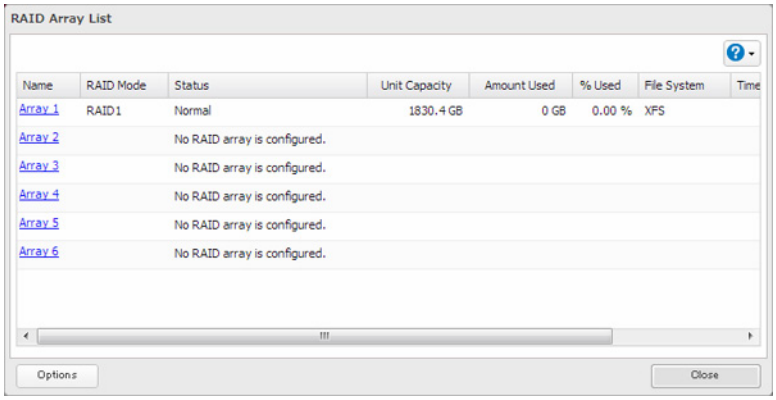
To change RAID settings, navigate to *Drives* - *RAID* in Settings.

Using JBOD

With JBOD, each hard drive in the TeraStation is addressed separately. To put drives from an array into JBOD, follow the steps below.

1 Select *RAID*.

2 Select the array to delete.



3 Click *Delete RAID Array*.

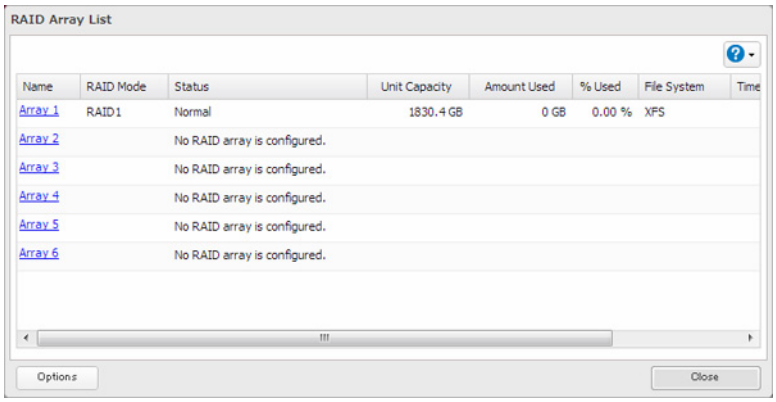
Once JBOD mode is configured, create shared folders on each drive to use them.

Changing RAID Mode

To change the RAID mode, first put the drives in JBOD.

1 Select RAID.

2 Click the array to delete.



Note: If the "RAID Mode" field is blank, the array is already in JBOD. Proceed to step 7.

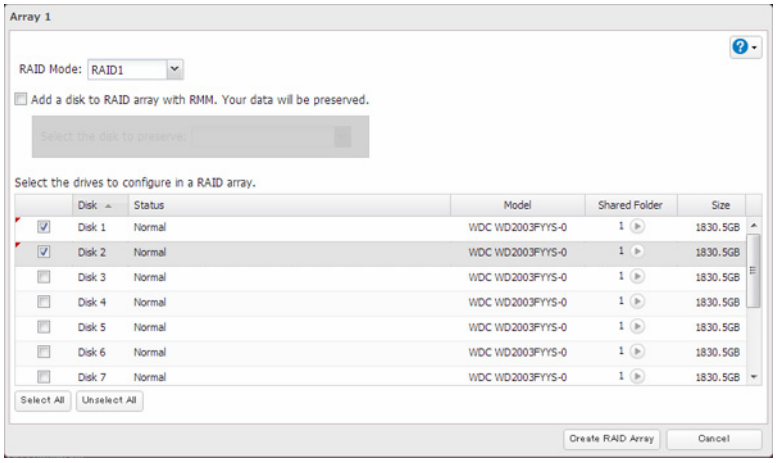
3 Click *Delete RAID Array*.

4 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.

5 Click *OK*.

6 Choose the array to configure.

7 Select a RAID mode and the drives to be used, then click *Create RAID Array*.



8 Step through the wizard to create the array.

Note: After changing the RAID mode, create a shared folder.

Configuring a Hot Spare

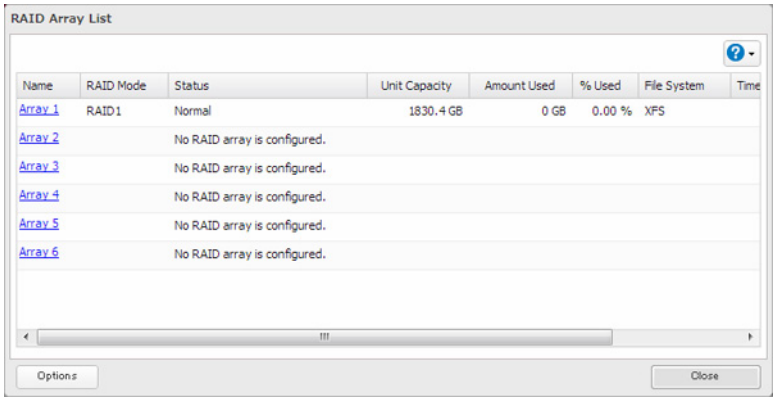
If you have a hot spare configured and an array fails, the TeraStation immediately switches over to the hot spare. To use a hot spare, you need an extra drive that's not part of any array and a RAID 1, RAID 10, RAID 5, RAID 51, RAID 6, or RAID 61 array.

Note: All data on the hot spare drive is deleted when it is configured as a hot spare and again when it changes from a spare to a drive in the array.

1 In Settings, click *Drives*.

2 Choose *RAID*.

3 Choose a RAID array.



4 Click *Set as a hot spare*.

5 Step through the wizard.

6 When the "Confirm Operation" screen opens, enter the confirmation number and click *OK*.

Notes:

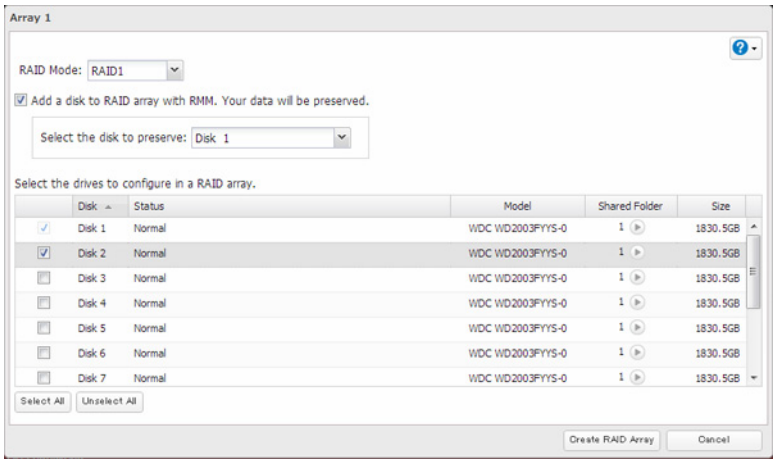
- To turn the hot spare back into a normal disk, choose *Set as a normal disk*.
  If a drive fails in the RAID array before it is rebooted, the hot spare will not automatically replace the failed drive. In this case, follow the steps below to repair the array.
  (1) In Settings, navigate to *Drives - Drives*.
  (2) Select the drive that was configured as a hot spare, then click *Dismount Disk*.
  (3) Click *Rediscover Disk*.
  (4) Navigate to *Drives - RAID*.
  (5) Select the RAID array to repair.
  (6) Select the drive that was previously configured as a hot spare, then click *Recover RAID Array*.
  This will rebuild the RAID array.
- After the hot-spare drive replaces a failed drive and the RAID array finishes rebuilding, the hot-spare drive status may still show "Hot Spare / Dismounted/ Plugged". Check the drive status LED. If it has changed from red to blue, the RAID array has finished rebuilding and is ready for use. This bug will be fixed in a future firmware update.

RMM (RAID Mode Manager)

With RMM, you can create or expand a RAID array without erasing the data on the drives.

Changing from JBOD to RAID 1

You must have at least two drives available in JBOD (not in a RAID array) to build the RAID 1 array with RMM.


Array 1
RAID Mode: RAID1
Add a disk to RAID array with RMM. Your data will be preserved.
Select the disk to preserve: Disk 1
Select the drives to configure in a RAID array.
Disk
Status
Model
Shared Folder
Size
Disk 1 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 2 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 3 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 4 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 5 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 6 Normal WDC WD2003FYYS-0 1 1830.5GB
Disk 7 Normal WDC WD2003FYYS-0 1 1830.5GB
Select All
Unselect All
Create RAID Array
Cancel

1 Select the drive on which you do not want to erase data.

2 Check "Add a disk to RAID array with RMM. Your data will be preserved.".

3 Select the drive to add to the RAID array.

4 Click *Create RAID Array*. The "Confirm Operation" screen will open.

5 Enter the confirmation number, then click *OK*.

Adding a drive to an existing RAID array

You can add a drive to a RAID 1, RAID 5, or RAID 6 array. Drives that can be added to the RAID array show "Normal (RMM available)" or "Normal".

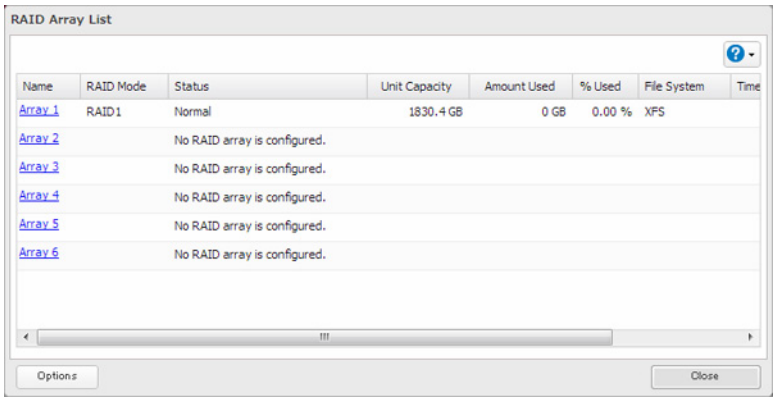
Notes:

- Each drive must have the same capacity.
- RMM can be used to expand an array by one drive per operation. To expand by two or more drives, RMM must be performed multiple times.

1 Click *Drives*.

2 Click *RAID*.

3 Choose a RAID array.



Changing the RAID mode while adding a drive:

- Select the drive you want to add to the RAID array and choose the mode for the array. Enter the "Confirm Operation" number and click *OK*.
- The "Confirm Operation" screen will open. Enter the number, then click *OK*.

RAID Scanning

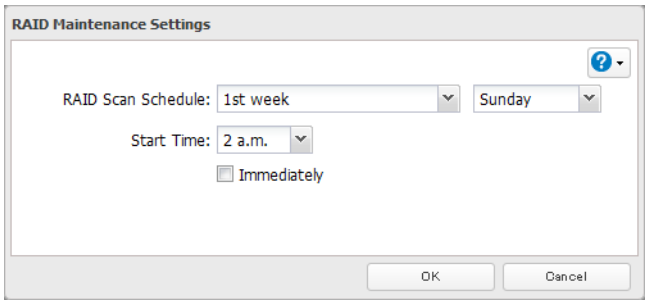
RAID maintenance scans your RAID array for bad sectors and if it finds any it automatically repairs them. Arrays other than RAID 0 are supported. For best results, run RAID maintenance regularly.

1 In Settings, click *Drives*.

2 Click the icon to the right of "RAID Scanning".

3 Click *Edit*.

4 Select the schedule for running RAID maintenance, then click *OK*.



Notes:

- Check "Immediately" to run RAID maintenance immediately.
- To stop a RAID scan, click *Abort RAID Scan*.
- The "1st week" of the month is days 1–7 of the month. The "2nd week" is days 8–14 of the month, etc. If you select one of these schedules, be sure to also select the day of the week for the scan to run.

5 Move the RAID scanning switch to the position to enable RAID scanning.

Note: Normally "I15" information message or code will be notified in NAS Navigator2, Settings, or error LED, however, it may not be displayed if your TeraStation's firmware version is 2.30. RAID scanning will start correctly when the scheduled time passed without the notification.

Adding an External Hard Drive

Connecting an External Drive

You can connect external drives to the USB ports on your TeraStation. Once connected, they appear as shared folders on the TeraStation. Formatted drives are detected automatically. Unformatted drives should be formatted in Settings.

After a USB drive is recognized, Windows adds "usbdisk X" under the TeraStation in "Network", where "X" is the USB port where the hard drive is connected.

The following USB devices are supported by the TeraStation:

- USB storage devices
- Card readers (except for card readers that can recognize two or more memory cards)
- Digital cameras
- USB-connected UPSs
- USB printers

Buffalo external USB drives are recommended.

These devices are not supported:

- DUB and DIU series drives
- Hubs, mice, and keyboards

Connect only one device to each USB port of the TeraStation. Some external drives with automatic power-on don't turn on automatically when connected to the TeraStation. Use their manual power switch to turn them on. Be sure to connect only one bus-powered drive at a time. If there is insufficient bus power for your USB drive, connect its AC adapter. Note that only the first partition of a connected USB hard drive is mounted. Additional partitions are not recognized.

Notes:

- Hubs are not supported. Connect a single USB drive to each USB port.
- Backup data from Mac OS may include characters that cannot be written to FAT16 or FAT32 drives such as ".DS_Store". For best results, reformat the drive before using it as a backup target.
- When external hard drives are connected to the USB port, they are recognized as shared folders with names of the form "usbdisk x". Depending on which USB port they are connected to, they will have the following settings by default:
  USB ports 1 to 4: Trashbox and backup are enabled.
  USB ports 5 and 6: Trashbox and backup are disabled.
- The TeraStation is compatible with most USB 2.0 external hard drives. Compatible USB 3.0 external drives include HD-LBU3 series, HD-LXU3 series, HD-PCTU3 series, HD-PNTU3 series, HD-PZU3 series (as of May 2013)

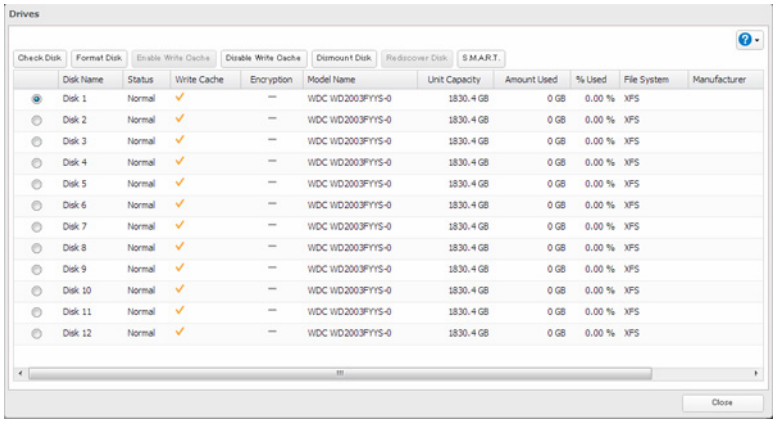
Dismounting Drives

If the TeraStation is powered on, dismount drives (internal and external) before unplugging them. You may dismount any drive from Settings. If the TeraStation is off, then all drives are already dismounted and may be unplugged safely.

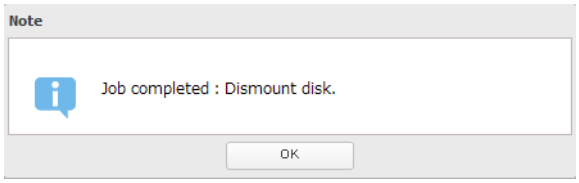
1 In Settings, click *Drives*.

2 Select *Drives* to dismount an internal drive or *USB Drives* to dismount an external drive.

3 Select the drive to dismount and click *Dismount Disk*.


Drives
Check Disk
Format Disk
Enable Write Cache
Disable Write Cache
Dismount Disk
Rediscover Disk
S.M.A.R.T.
Disk Name
Status
Write Cache
Encryption
Model Name
Unit Capacity
Amount Used
% Used
File System
Manufacturer
Disk 1 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 2 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 3 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 4 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 5 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 6 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 7 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 8 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 9 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 10 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 11 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 12 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Close

4 When the following message is displayed, it is safe to unplug the drive.



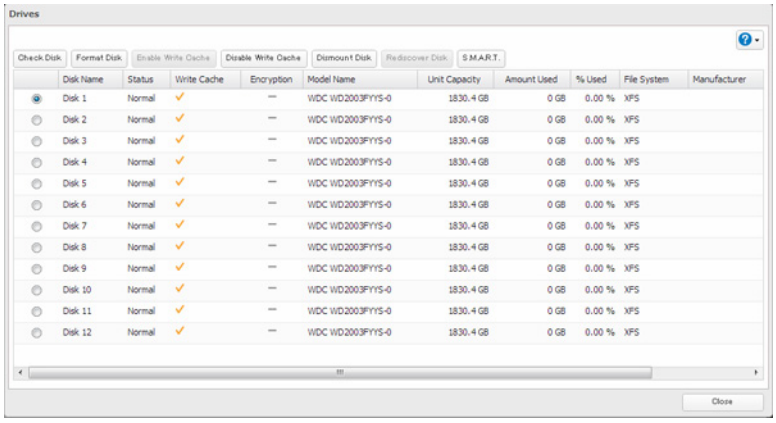
Checking Drives

A disk check tests the data on a drive in the TeraStation or connected via USB for integrity. Errors are fixed automatically. With large drives, a disk check may run for many hours. Shared folders cannot be accessed during a disk check. Do not turn off the TeraStation until the disk check is finished. Use the procedure below to run a disk check.

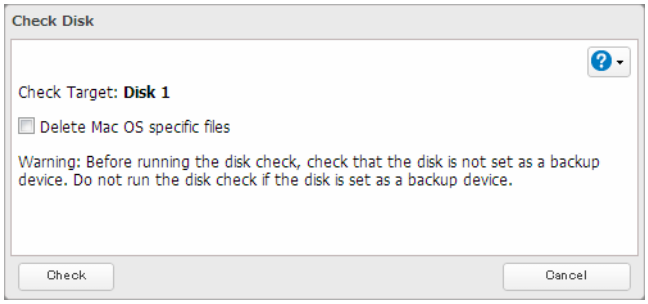
1 In Settings, click *Drives*.

2 Select *Drives* to check an internal drive or *USB Drives* to check an external drive.

3 Select the drive to test, then click *Check Disk*.


Drives
Check Disk
Format Disk
Enable Write Cache
Disable Write Cache
Dismount Disk
Rediscover Disk
S.M.A.R.T.
Disk Name
Status
Write Cache
Encryption
Model Name
Unit Capacity
Amount Used
% Used
File System
Manufacturer
Disk 1 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 2 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 3 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 4 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 5 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 6 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 7 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 8 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 9 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 10 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 11 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Disk 12 Normal WDC WD2003FYYS-0 1830.4 GB 0 GB 0.00 % XFS
Close

4 Click *Check*. You have the option of deleting information files from Mac OS during the check if desired.


Check Disk
Check Target: Disk 1
Delete Mac OS specific files
Warning: Before running the disk check, check that the disk is not set as a backup device. Do not run the disk check if the disk is set as a backup device.
Check
Cancel

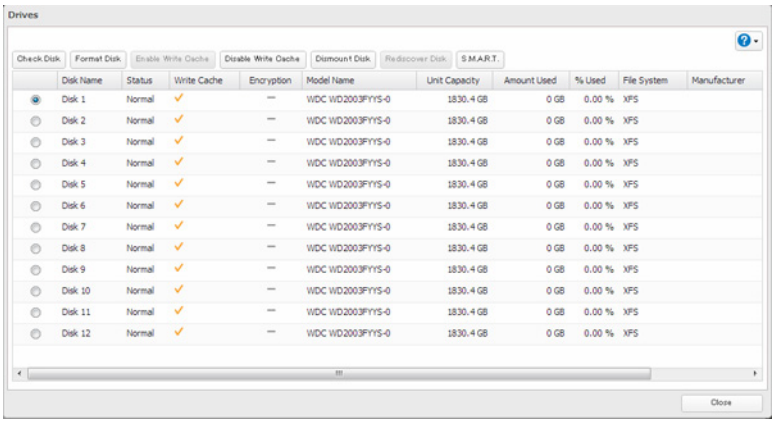
S.M.A.R.T.

S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) monitors hard drives to detect and report various indicators of reliability, in the hope of anticipating failures. When a failure is anticipated by S.M.A.R.T., the user may choose to replace the drive to avoid outages and data loss. Follow the steps below to check S.M.A.R.T. information for the TeraStation's internal drives.

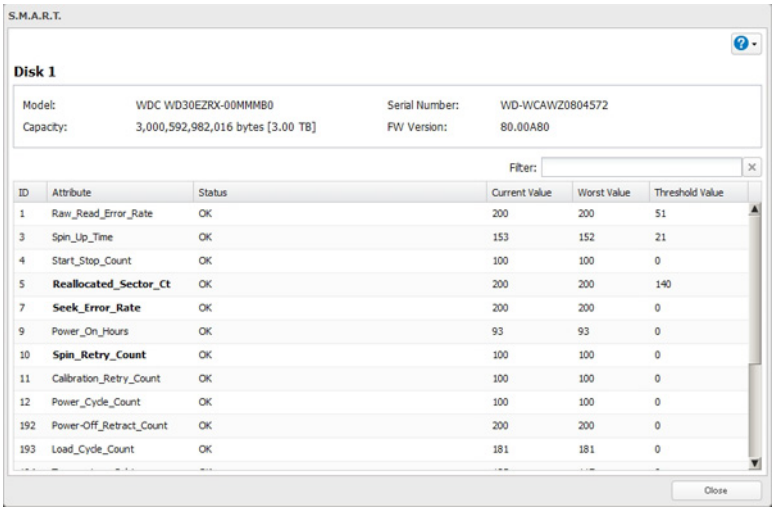
Note: S.M.A.R.T. information is only available for internal drives.

1 In Settings, navigate to *Drives - Drives*.

2 Select a drive to check and click *S.M.A.R.T.*



3 The S.M.A.R.T. information for the drive will be displayed. Different information may be displayed depending on the brand of drives in your TeraStation. Critical attributes are displayed in bold. Attributes with current value less than or equal to the threshold value may be significant. If an attribute reports a failure, or has had one in the past, it will be displayed in the status column.



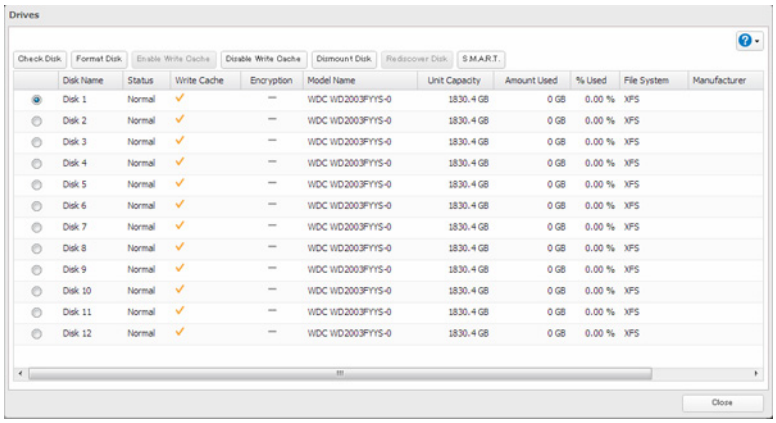
Formatting Drives

Note: Under some circumstances, data deleted when a drive is formatted can be recovered. To ensure that data is "gone forever", a format might not be sufficient. See "Erase Data on the TeraStation Completely".

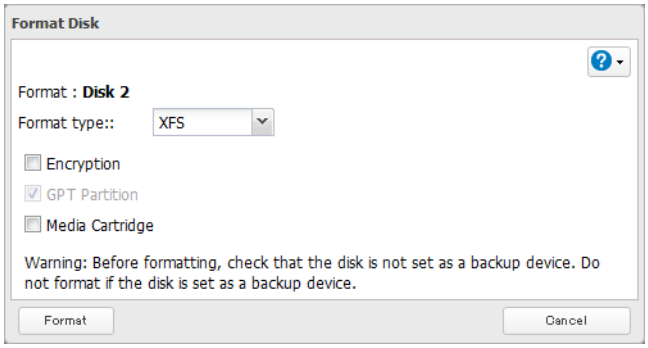
1 In Settings, click *Drives*.

2 Select *Drives* to format an internal drive or *USB Drives* to format an external drive.

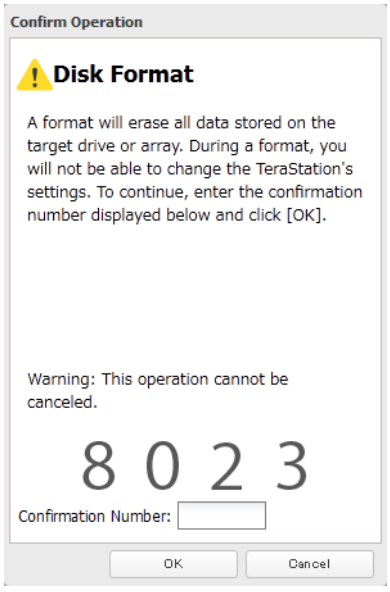
3 Select the drive to format, then click *Format Disk*.



4 Select a format type, then click *Format*.


Format Disk
Format : Disk 2
Format type::
XFS
Encryption
GPT Partition
Media Cartridge
Warning: Before formatting, check that the disk is not set as a backup device. Do not format if the disk is set as a backup device.
Format
Cancel

5 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.


Confirm Operation
Disk Format
A format will erase all data stored on the target drive or array. During a format, you will not be able to change the TeraStation's settings. To continue, enter the confirmation number displayed below and click [OK].
Warning: This operation cannot be canceled.
8023
Confirmation Number:
OK
Cancel

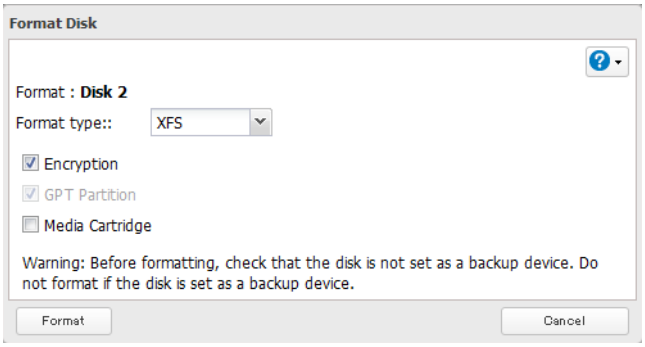
6 Depending on the size of your drive, the format may take several minutes or several hours to complete. "I20 DISKx Formatting" will be displayed in NAS Navigator2 until the format is complete.

Notes:

- Do not turn off or disconnect power to the TeraStation while formatting a hard drive.
- Format drives of 2.2 TB or larger with GPT partitions. For many drives, this option will be enabled automatically during format.

Encrypting Drives

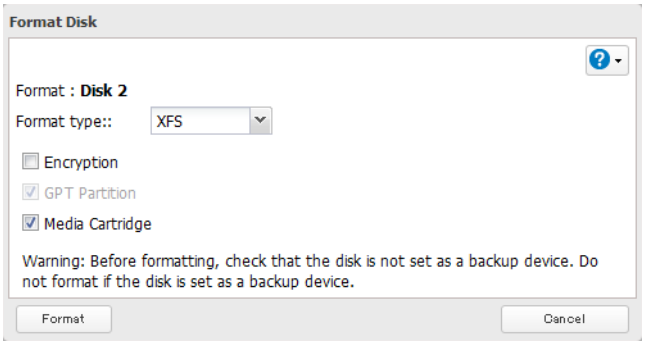
Internal drives (and arrays) can be encrypted with 128-bit AES during formatting. Encrypted drives and arrays are then readable only from that specific TeraStation. To unencrypt a drive or array, uncheck "Encryption" and format it again.


Format Disk
Format : Disk 2
Format type:: XFS
Encryption
GPT Partition
Media Cartridge
Warning: Before formatting, check that the disk is not set as a backup device. Do not format if the disk is set as a backup device.
Format
Cancel

Media Cartridges

If configured as a media cartridge, an internal drive can be used as a removable storage device in the same way as an external drive. Media cartridges can be unplugged and connected to a different TeraStation with all data intact.

To configure a drive as a media cartridge, check "Media Cartridge" during formatting. To return it to its original state, uncheck "Media Cartridge" and reformat the drive.


Format Disk
Format : Disk 2
Format type:: XFS
Encryption
GPT Partition
Media Cartridge
Warning: Before formatting, check that the disk is not set as a backup device. Do not format if the disk is set as a backup device.
Format
Cancel

Media cartridge do not support:

- RAID arrays
- LVM volumes
- Access restrictions
- Direct connection to a Windows computer

Erase Data on the TeraStation Completely

Under some circumstances, data from formatted drives can be recovered. The disk erasure process in this section does a much more thorough job of erasing data. This procedure is recommended for removing all data from a drive in a way that makes it nearly impossible to recover with current tools. All data on the drives is completely erased. The TeraStation will then be in the following state:

- All drives in JBOD
- An empty shared folder on each drive
- All settings returned to their default values

- All logs deleted

If you remove a drive and then erase all data on the TeraStation, NAS Navigator2 will show the error "HDx Error E22 HDx Can't Mount" where X is the hard drive you removed. You can still use the TeraStation.

Follow the procedure below to completely and permanently erase all data from your TeraStation.

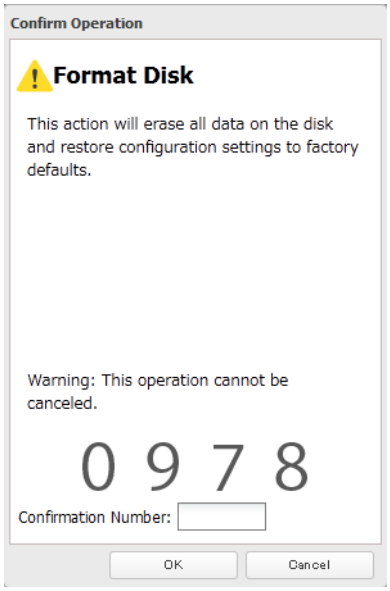
1 In Settings, click *Management*.

2 Select *Restore/Erase*.

3 Click *Erase TeraStation*.

Erase
This will erase all data and settings and return the TeraStation to its factory defaults. Erased data cannot be restored. Several hours will be required for this process.
Erase TeraStation

4 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.


Confirm Operation
Format Disk
This action will erase all data on the disk and restore configuration settings to factory defaults.
Warning: This operation cannot be canceled.
0 9 7 8
Confirmation Number:
OK
Cancel

5 All data on the TeraStation will be permanently erased. When the erase finishes, the TeraStation will shut down.

Disk Quotas

Notes:

- When using quotas, disable the recycle bin or empty the trash folder often. The limited space includes the space used for trash.
- Quotas apply per drive or per array. If a quota is set to 1 GB, each array or drive can use a maximum of 1 GB.
- Quotas cannot be set for external hard drives connected to the TeraStation and hard drives that are configured as media cartridges.

- If both user and group quotas are configured for a user, the most restrictive quota will always apply.

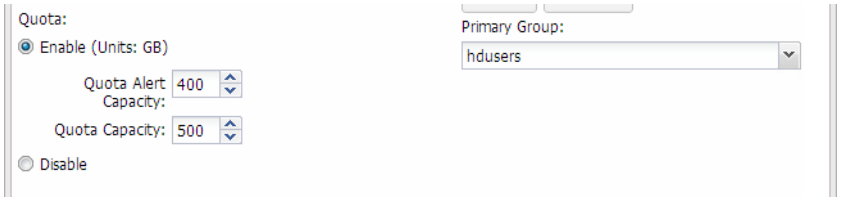
Quotas for Users

Follow this procedure to limit the total drive space available for a user.

1 In Settings, click to the right of "Users".

2 Select the user whose space will be limited.

3 Enable quotas, choose the maximum space the user will be allowed to use, and click *OK*.



4 Click *Close*.

Quotas for Groups

Follow the procedure below to limit the total drive space that each group can use.

1 In Settings, click to the right of "Groups".

2 Select the group whose space will be limited.

3 Enable quotas, choose the maximum space the group is allowed, and click *OK*.

4 Click *Close*.

5 In Settings, click to the right of "Users".

6 Change the user's primary group to the group with the quota, then click *OK*.

7 Click *Close*.

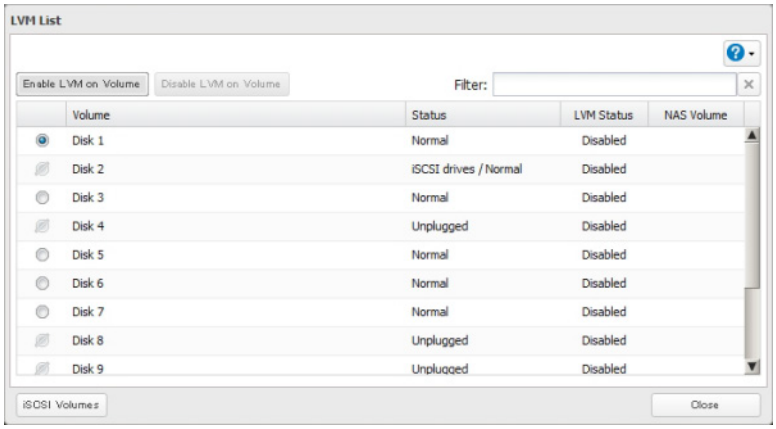
Size Limits

If LVM is enabled, volumes can be created with maximum size limits. Up to 32 LVM and iSCSI volumes are supported.

1 In Settings, click *Drives*.

2 Select *LVM*.

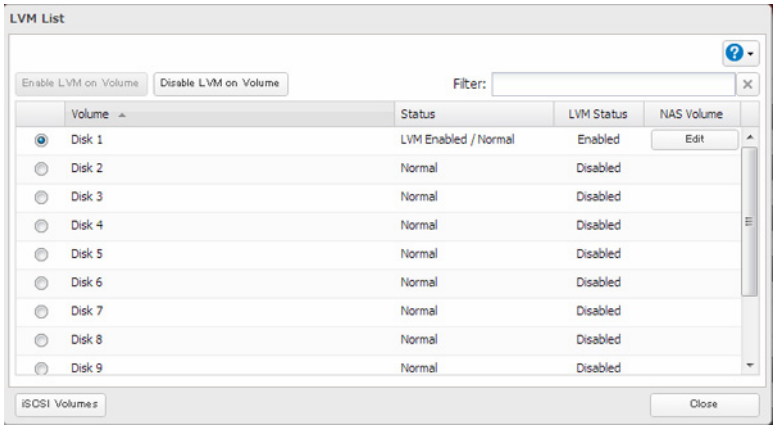
3 Select the drive where the volume will be located and click *Enable LVM on Volume*.



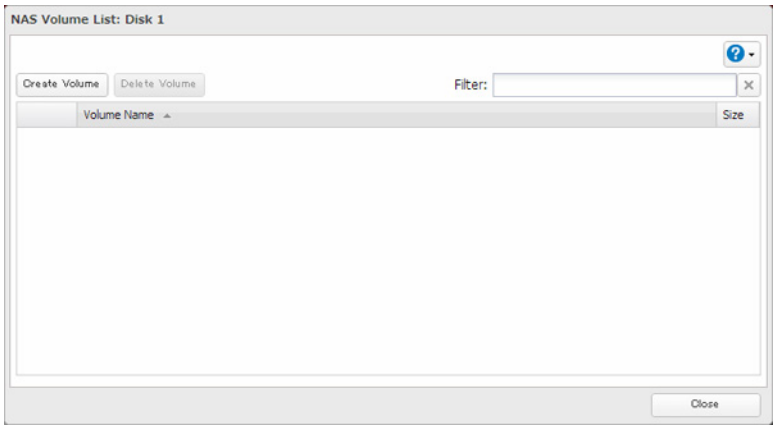
4 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.

5 Click *OK*.

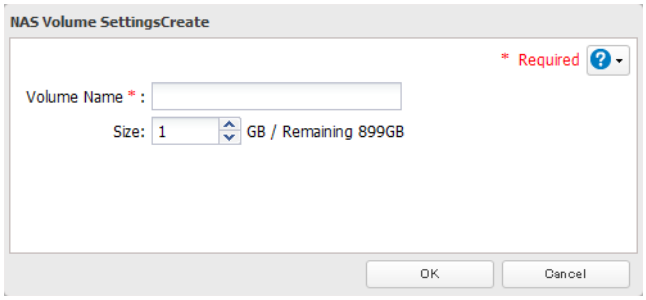
6 Click *Edit* under "NAS Volume".



7 Click *Create Volume*.



8 Configure the desired settings, then click *OK*.



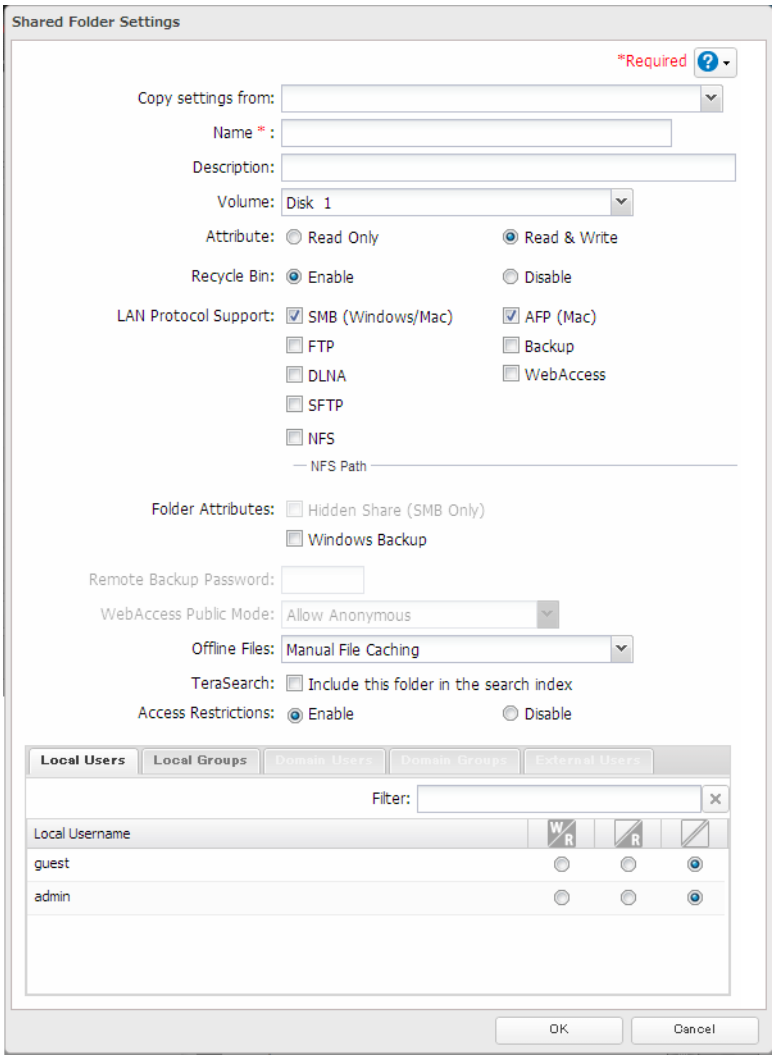
9 Click *Close*.

10 Click *Close*.

11 Navigate to *File Sharing - Folder Setup*.

12 Click *Create Folder*.

13 Configure the settings.



Notes:

- The name may contain up to 27 alphanumeric characters, hyphens (-), and underscores (_). Do not use a symbol as the first character.
- The description may contain up to 75 alphanumeric characters, hyphens (-), underscores (_), and spaces. Do not use a symbol or space as the first character.
- If multi-byte characters are used in a shared folder name used for both AFP and FTP, configure the client language to match the characters that are being used. Also, you may be unable to access the folder if certain characters are used in the name, so the use of letters and numbers only is recommended.
- The names of shared folders used for both AFP and FTP should not use characters from different language sets (such as mixing Japanese and Korean characters, for instance).

14 Select the volume that you created and click *OK*.

Using the TeraStation as an iSCSI Device

Introduction

iSCSI is a protocol for carrying SCSI commands over IP networks. Unlike traditional SAN protocols such as fibre channel, which requires special-purpose cabling, iSCSI can be run over long distances using existing network infrastructure. Normal Windows formatting such as NTFS is supported.

Differences Between NAS and iSCSI

With iSCSI, the TeraStation is connected to a single computer, such as a server. Other computers on the network access files on the TeraStation through the computer it's connected to. The TeraStation can be used as a local drive from Windows Server. Features of Windows Server such as Active Directory can be used normally.

As a NAS, the TeraStation is a server, and computers (including other servers) on the network can access shared folders on it directly. A separate server is not required, and features such as backup are built-in.

Network Configuration

Use gigabit or faster network equipment with iSCSI. For best results, a dedicated network for iSCSI is recommended, separate from the regular network. Use fixed IP addresses for storage devices such as the TeraStation.

Advanced iSCSI Settings

Advanced settings for iSCSI are available in Settings. Navigate to *Drives - iSCSI* and click on your volume name. *Advanced Settings* will be at the bottom left of the window. The default values for each of these settings are recommended for most users.

Install the Microsoft iSCSI Software Initiator

Windows XP, Windows Server 2003

Before using iSCSI equipment with Windows XP or Windows Server 2003, download and install the "Microsoft iSCSI Software Initiator".

1. Go to http://www.microsoft.com.
2. Search for "Microsoft iSCSI Software Initiator".
3. Download the latest version of the Microsoft iSCSI Software Initiator.
4. When the download is complete, double-click on the installer. Check the "Initiator Service" and "Software Initiator" checkboxes.
5. Step through the wizard to install.

Windows 8.1, Windows 8, Windows 7, Windows Vista, Windows Server 2008, Windows Server 2012

If you are using Windows 8.1, Windows 8, Windows 7, Windows Vista, Windows Server 2008, or Windows Server 2012, the Microsoft iSCSI Software Initiator is already installed on your computer. You don't need to download and install it.

iSCSI Setup

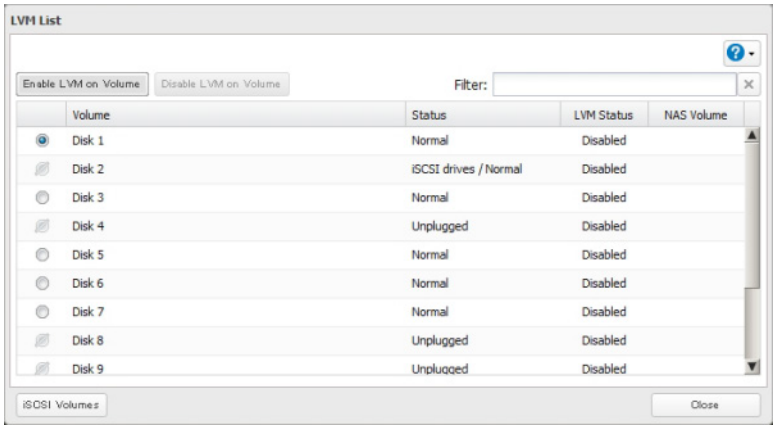
To use the TeraStation as an iSCSI hard drive, configure it as described below.

1 Connect the TeraStation's Ethernet and power cables and configure the TeraStation's IP address and its clock.

2 In Settings, click *Drives*.

3 Choose *LVM*.

4 Select the drive where the volume will be created and click *Enable LVM on Volume*.



Notes:

- Enabling LVM before using a drive as an iSCSI drive is optional. If LVM is not enabled, you can still create one iSCSI volume from the entire drive. However, enabling LVM is recommended for drives that will be used for iSCSI.
- If the LVM settings are changed, all data on the volume will be erased. Before changing the settings, back up any important data.

5 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.

6 Click *OK*.

7 Move the iSCSI switch to the position to enable iSCSI.

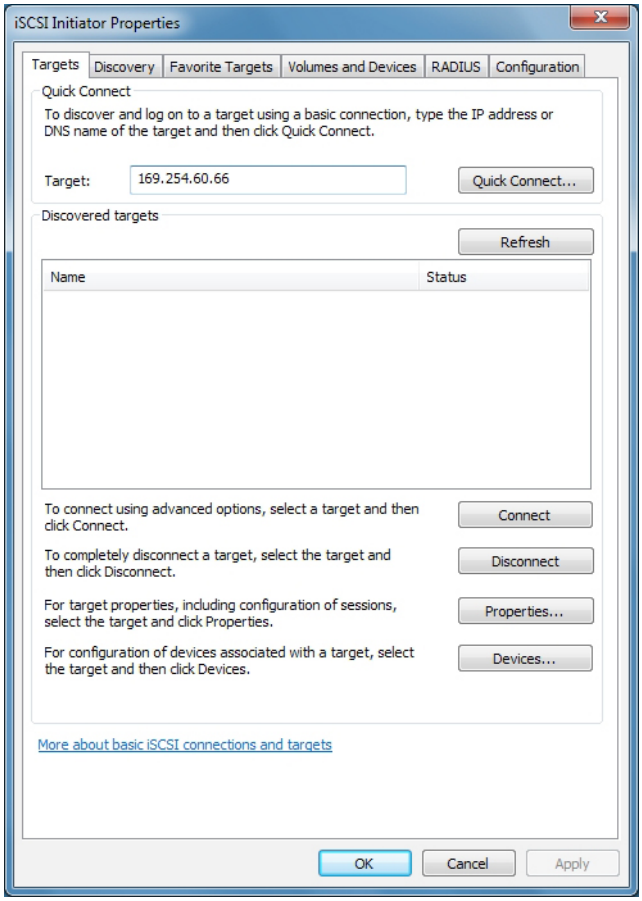
8 Click to the right of "iSCSI".

9 Click *Create Volume*.

10 Enter a volume name, volume description, volume, and size, then click *OK*.

11 Click *Close*.

12 Connect the new volume. The process for this will depend on your iSCSI software. For the Microsoft iSCSI Software Initiator, navigate in Windows to *Control Panel - Administrative Tools - iSCSI Initiator*, enter the IP address of the TeraStation in the "Target" field, and click *Quick Connect*.


iSCSI Initiator Properties
Targets
Discovery
Favorite Targets
Volumes and Devices
RADIUS
Configuration
Quick Connect
To discover and log on to a target using a basic connection, type the IP address or DNS name of the target and then click Quick Connect.
Target:
169.254.60.66
Quick Connect...
Discovered targets
Refresh
Name
Status
To connect using advanced options, select a target and then click Connect.
Connect
To completely disconnect a target, select the target and then click Disconnect.
Disconnect
For target properties, including configuration of sessions, select the target and click Properties.
Properties...
For configuration of devices associated with a target, select the target and then click Devices.
Devices...
More about basic iSCSI connections and targets
OK
Cancel
Apply

Note: Windows XP computers will not reconnect iSCSI volumes automatically if iSCSI has been disabled. After re-enabling iSCSI, reconnect from your iSCSI initiator.

13 The connected volume will be recognized by the computer as an unallocated volume. Assign and format the volume in Windows. When the format process is completed, the drive will be visible as an icon in "Computer" or "My Computer" and can be used as a normal drive on the computer.

Use with Multiple Computers

If the TeraStation is divided into multiple volumes (or drives), it can be used with multiple computers. Accessing a single volume or drive from multiple computers is not recommended.

Checking Whether iSCSI Volume is Connected

To check whether an iSCSI volume is connected, navigate to *Drives - iSCSI - iSCSI Settings* and select *Connection*. If "Connected" is displayed, the TeraStation is currently connected to the client.

Mutual Authentication with the TeraStation

The TeraStation can perform mutual authentication (two-way authentication). Dual passwords ensure that only authorized client computers can access the volumes on the TeraStation.

Mutual Authentication Password Setup for the TeraStation

In Settings, navigate to *Drives - iSCSI - Security - Access Restrictions for Entire System - Edit - Access Restrictions*. Click *Mutual Authentication* and set a mutual authentication password.

Mutual Authentication Password Setup for Individual Volumes

In Settings, navigate to *Drives - iSCSI - Create Volume*. Enable access restrictions and mutual authentication. Set the mutual authentication password that will be required to connect to each volume.

Mutual Authentication Password Setup for Your Computer

Each computer that connects to an iSCSI volume will need to enter the mutual authentication password for the volume. A computer cannot connect to multiple volumes with different mutual authentication passwords at the same time.

Creating and Expanding Volumes

Creating an iSCSI Volume

Up to 32 iSCSI and LVM volumes are supported. Each individual iSCSI volume can be connected to different computers (a single iSCSI volume cannot be connected to multiple computers).

Notes:

- When an iSCSI volume is deleted, all data contained in the iSCSI volume is erased. Before changing settings, back up any important data.
- Enable LVM (previous page) to delete or create volumes.

1 In Settings, click *Drives*.

2 Click *iSCSI*.

3 Click *Create Volume*.

4 Choose a name, description, volume, and size, then click *OK*.

5 Click *Close*.

Note: Before use, connect the new volume with an iSCSI connection tool and format the volume from within your

OS.

Expanding the Volume Size

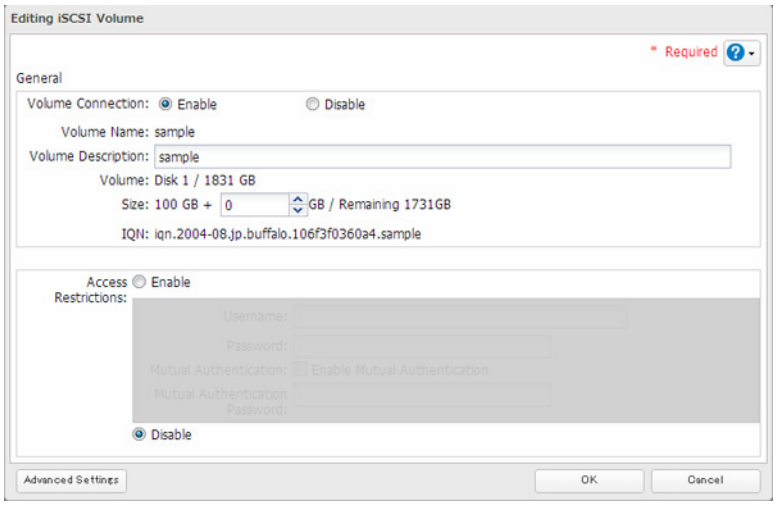
You can expand the size of a volume. If the iSCSI volume is on an LVM-enabled drive or array, you can also create or delete the volume.

1 In Settings, click *Drives*.

2 Choose *iSCSI*.

3 Click the volume you want to expand.

4 Enter a new size and click *OK*.

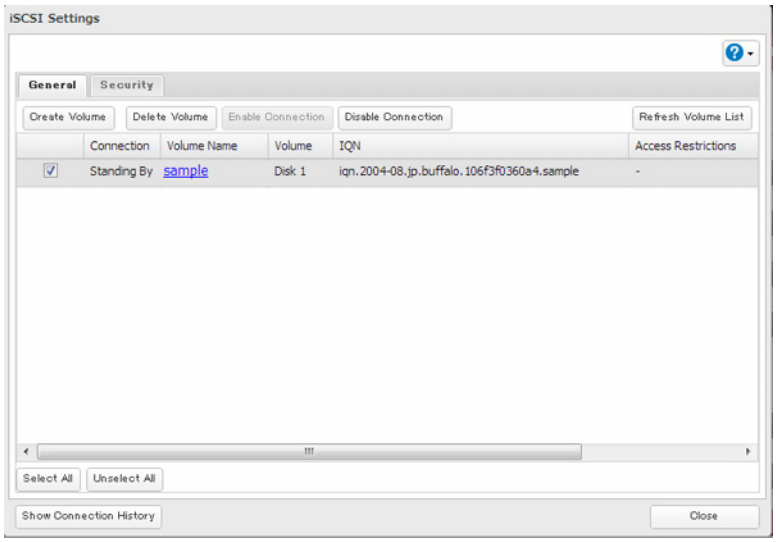


5 Click *OK*.

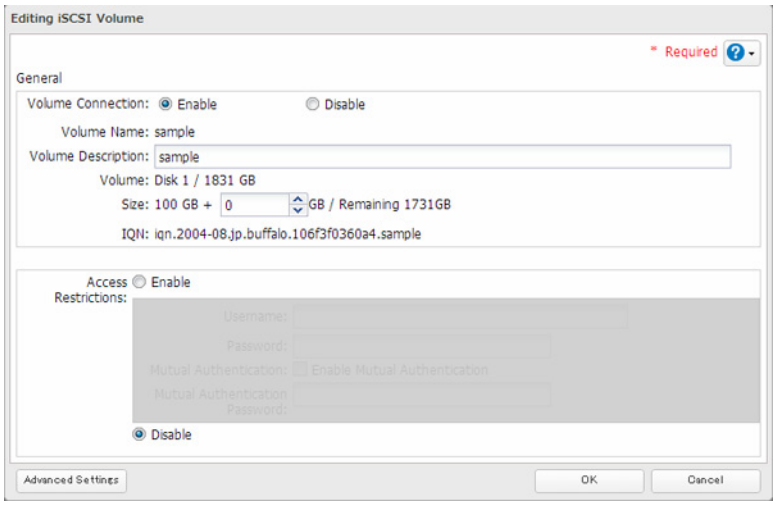
6 Click *Close*.

Disconnecting Volumes

From Settings, you may temporarily disconnect iSCSI volumes from any initiators and clients.



Navigate to *Drives - iSCSI*. Select the iSCSI volume to disconnect and click *Disable Connection*. To reconnect the volume, click *Enable Connection*.



Similarly, you may connect or disconnect a volume from the editing page by enabling or disabling *Volume Connection*.

Setting Access Restrictions

A username and password can be set following the procedure below for the entire TeraStation iSCSI volume or for each volume.

Setting Access Restrictions for an Entire iSCSI Volume

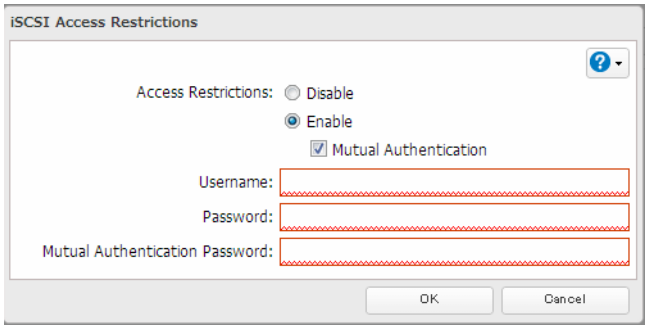
1 In Settings, click *Drives*.

2 Click to go into iSCSI settings.

3 Click the *Security* tab.

4 Click *Edit*.

5 Enable "Access Restrictions", enter the username and password, and click *OK*.



Note: To use mutual authentication with access restrictions, configure the settings:

- In the screen shown above, check "Mutual Authentication" and enter the password in the "Mutual Authentication Password" field.
- In the "User Authorization" window displayed when the TeraStation is connected, select "Enable Mutual Authentication" to connect. Enter the mutual authentication password.
- If using the iSCSI Initiator from Windows 8.1, Windows 8, Windows 7, Windows Vista, or Windows Server 2008, configure the CHAP login information to allow searching for or connecting to targets.

6 Click *Close*.

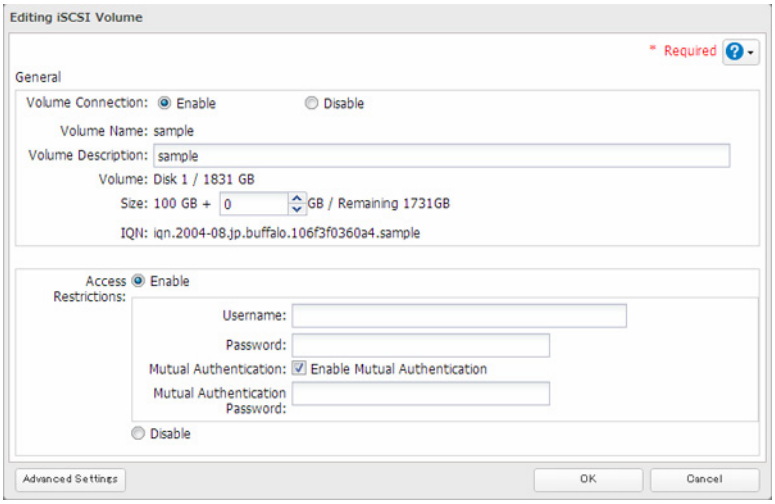
Setting Access Restrictions for Individual Volumes

1 In Settings, click *Drives*.

2 Click to the right of "iSCSI".

3 Click the volume where you want to set the access restrictions.

4 Enable "Access Restrictions", enter the username and password, then click *OK*.



5 Click *Close*.

Mutual Authentication Access Restrictions by Username and Password

To set access restrictions using mutual authentication in addition to regular access restrictions, configure the settings as shown below.

- In the screen above, check "Mutual Authentication" and enter the password in the "Mutual Authentication Password" field.
- In the "User Authorization" screen displayed when the TeraStation is connected, select "Enable Mutual Authentication".
- The entry screen for the mutual authentication password will be displayed again. Enter the password.
- If using the iSCSI Initiator included with Windows 8.1, Windows 8, Windows 7, Windows Vista, or Windows Server 2008, set the CHAP login information for target searches and connections.

Mutual Authentication Access Restrictions by IP Address

To set access restrictions by IP address, enable "IP Address Restrictions" as shown above, enter the IP addresses that will be allowed access in the "IP Address List", and click *OK*.

Hard Drive Replacement

Hard drives in the TeraStation show a blue status LED during normal operation. When a drive fails, its error LED will glow red. A failed drive whose error LED is glowing red may be hot-swapped.

Notes:

- Do not unplug a drive whose status LED is blue. Dismount it first or shut down the TeraStation before swapping a working drive. If you remove the drive without properly dismounting it, data may be lost or the TeraStation may malfunction.
- Use a Buffalo OP-HDS series drive of the same size for the replacement drive..
- To avoid damaging the TeraStation with static electricity, ground yourself by touching something made of metal before handling any sensitive electronic parts.
- After a drive is replaced, it takes about 30 minutes before normal file reading and writing are restored. Settings may not be accessible during this period.

- Do not change the order of the hard drives in the TeraStation. For example, pulling out drive 1 and replacing it with drive 2 may cause data to be corrupted or lost.
- If a new drive is not recognized, click *Rediscover Disk* in Settings.
- If two drives fail at the same time, replace and resync them one at a time.

Hard Drive Replacement Examples

Drive Replacement (using a redundant RAID mode such as RAID 1, 5, or 6 with auto-shutdown disabled)

This section describes replacing a drive with the TeraStation on.

1. The failed drive's status LED will be glowing red. Push its unlock button and swing the lock mechanism out.
2. Pull out the drive cartridge and remove it from the TeraStation.
3. Insert the new drive in the empty slot. Slide the drive in with the locking mechanism open.
4. Swing the lock back down until it clicks into place.
5. When the replacement hard drive is recognized, the status LED will flash red. The TeraStation will start rebuilding the RAID array automatically.

Drive Replacement (using a redundant RAID mode such as RAID 1, 5, or 6 with auto-shutdown enabled)

This section describes the process of replacing a drive while the TeraStation is off.

1. Push the unlock button of the failed hard drive and swing the lock mechanism out.
2. Pull out the drive cartridge and remove it from the TeraStation.
3. Insert the new hard drive in the empty slot. Slide the drive in with the locking mechanism open. Swing the lock back down until it clicks into place.
4. Press the power button on the TeraStation.
5. When the replacement hard drive is recognized, the status LED will flash red.
6. The TeraStation will start rebuilding the RAID array automatically.

Drive Replacement (RAID 0 or JBOD)

Drives in a RAID 0 array or JBOD mode do not automatically turn off in the event of a malfunction. Before replacing the failed drive, either dismount the drive from Settings, or shut down the TeraStation. This section describes the process of replacing a drive with the TeraStation on.

1. In Settings, navigate to *Drives - Drives*.

2 Select the hard drive with the flashing status LED and click *Dismount Disk*.

3 The status LED will stop flashing and glow steadily.

4 Unlock the failed drive by pushing the unlock button and swinging the lock mechanism out.

5 Pull out the hard drive cartridge and remove it from the TeraStation.

6 Insert the new hard drive (sold separately) into the empty slot. Slide the drive in with the locking mechanism open. Swing the lock back down until it clicks into place.

7

For RAID 0
When the replacement drive is recognized, the status LED will flash red and the message "Set From Web I32 New Diskx ready" will be displayed in NAS Navigator2.
Select *Drives - RAID* - the RAID array In Settings and click *Delete RAID Array*.
Select the replacement hard drive by navigating to *Drives - Drives* and clicking *Format Disk* to format the new drive.
Configure RAID mode by selecting *Drives - RAID* after formatting the hard drive.
If a hard drive malfunctions in RAID 0, all data on the RAID array will be lost. All of the settings for the shared folders (such as access restrictions) are erased after replacing a drive from a RAID 0 array. Create a shared folder before use.
For JBOD
When the replacement hard drive is recognized, the status LED will flash red and the drive will be formatted as an individual drive. If this drive is removed from the TeraStation, shared folder settings such as access restrictions will be lost. Create a shared folder on the drive before use.

Drive Replacement (using a redundant RAID mode such as RAID 1, 5, or 6 with a hot spare configured)

If your TeraStation's drives are in a redundant RAID mode, and you have a hot spare enabled, a malfunctioning drive in the array is replaced by the spare disk and the RAID array is rebuilt automatically. The status LED will continue to glow red for the failed drive even after the RAID array is rebuilt with the hot spare. This section describes the replacement process for a hard drive while the TeraStation is still on.

1 The failed drive's status LED will be glowing red. Push its unlock button and swing the lock mechanism out.

2 Pull out the drive cartridge and remove it from the TeraStation.

3 Insert the new drive in the empty slot. Slide the drive in with the locking mechanism open. Swing the lock back down until it clicks into place.

4 When the replacement drive is recognized, the status LED will flash red. The replacement hard drive is automatically registered as a hot spare. To use the replacement disk as a normal drive rather than a hot spare, navigate to *Drives - RAID* and click the RAID array, select the new drive, and click *Set as a normal disk*.

Replacing a Media Cartridge

Drives configured as media cartridges may be removed and moved to a different TeraStation for use. Before unplugging the drive, dismount it in Settings or shut down the TeraStation.

Chapter 5 Backup

Back Up from the TeraStation

You can back up TeraStation folders to:

- A different folder on the TeraStation
- Another LinkStation on the network
- Another TeraStation on the network

You can also configure backup jobs from Easy Setup.

Preparing a Backup Destination

First, configure a folder as a backup destination.

1 In Settings, navigate to *Folder Setup*.

2 Choose the folder to set as a backup destination.

3 Click *Edit*.

4 Check "Backup" from "LAN Protocol Support", then click *OK*.

Note: To configure a password, enter it in the "Remote Backup Password" field. Leave this field blank if you don't want a password. If the target device is configured with a backup password, you can easily find the backup target folder during configuration of the backup job by searching for the password.

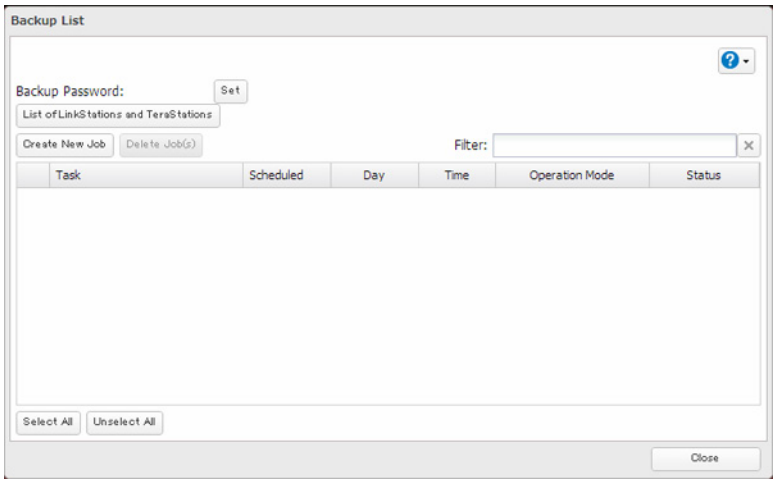
Backing up to a LinkStation or TeraStation on another network when connected by a VPN

You can back up to a LinkStation or TeraStation on another network as long as the two networks are connected by a VPN. Follow this procedure to enter the IP address or hostname of the target LinkStation or TeraStation.

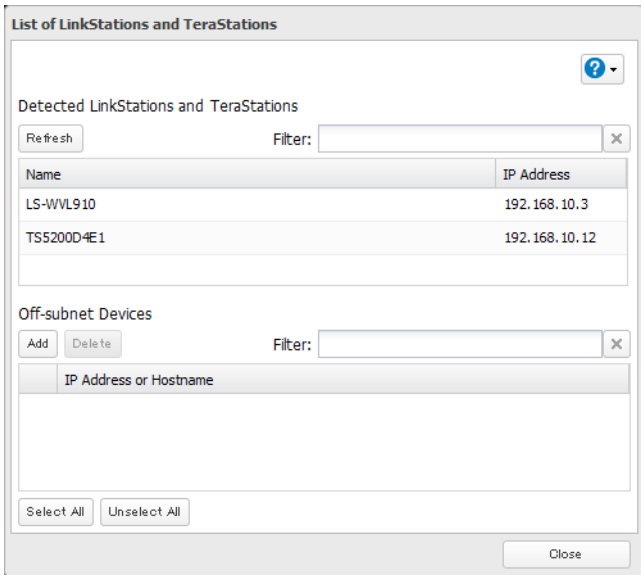
1 In Settings, click *Backup*.

2 Click to the right of "Backup".

3 Click *List of LinkStations and TeraStations*.



4 Click *Add*, enter the IP address of the target LinkStation or TeraStation, and click *Close*.



If your setup meets the requirements below, you don't have to configure these settings:

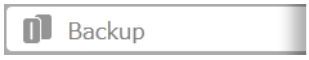
- The source and target TeraStations are on the same network.
- No backup password is set for the target TeraStation.
- No TeraStation from outside the subnet, or connected by a VPN, is used.

Notes:

- To back up data between LinkStations or TeraStations on a network using jumbo frames, make sure that both devices are configured to use identical (or similar) Ethernet frame sizes. If Ethernet frame sizes are significantly different, the backup job may not be properly performed. In such a case, select the default frame size (1500 bytes).
- You can also specify hostname by a fully qualified domain name (FQDN).

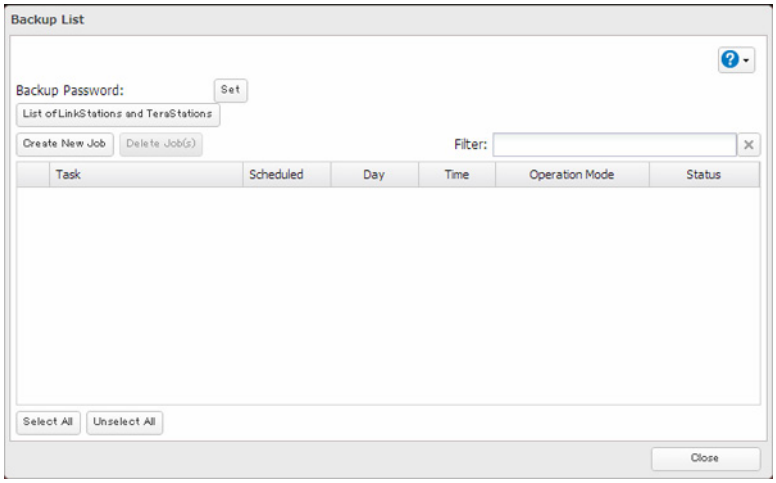
Configuring a Backup Job

1 In Settings, click *Backup*.



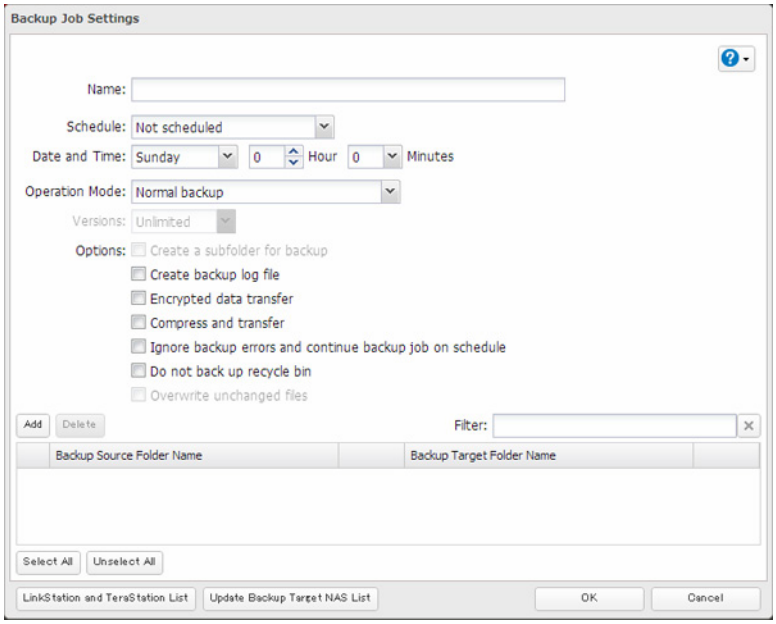
2 Click to the right of "Backup".

3 Click *Create New Job*.



Note: Up to 8 backup jobs can be configured.

4 Select backup settings such as date and time to run.



The following types of backup jobs may be selected:

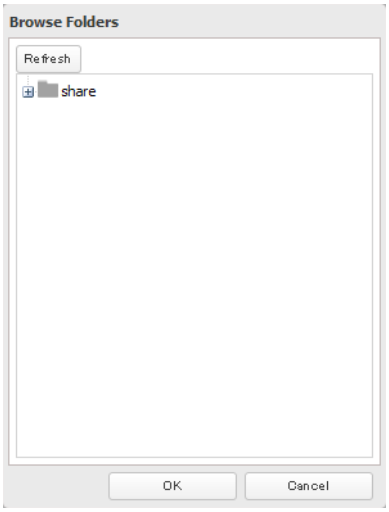
Type	Files included
Normal backup	All files in the source will be backed up to the destination.
Overwrite (incremental)	The first time the backup job runs like a normal backup. In subsequent backups, files added to the source as well as files deleted from the source are kept in the backup folder.
Overwrite (differential)	The first backup job runs like a normal backup. As each additional backup job runs, files are added to and deleted from the backup folder. The backup destination folder is always the same size as the backup source folder.

Type	Files included
Management backup	Each time a backup is executed, management information is stored, and only files that have changed are copied or deleted. Data is retrieved from the previous backup file for files that were not changed. This is useful for making backups with limited space or for referencing status at a particular point in time (for use for data snapshot applications). The destination folder for a management backup should be a local folder on this TeraStation or on a USB drive attached to it. The target folder will be set to read-only. Do not use folders from drives formatted with FAT.

5 Click *Add*.

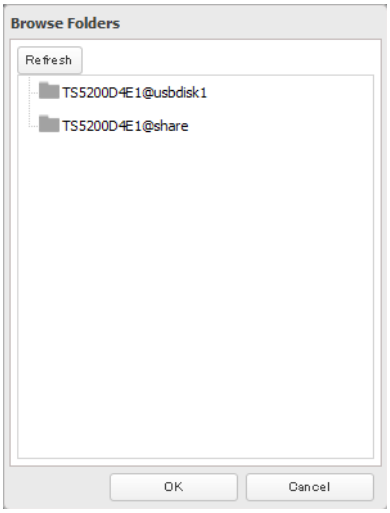
6 Click *Browse* under "Backup Source Folder Name".

7 Select the shared folder that will be the backup source, then click *OK*.



8 Click *Browse* under "Backup Target Folder Name".

9 Select the backup target and click *OK*.



10 Click *OK*. Tasks added to "Backup List" are displayed.

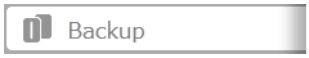
Note: If the backup task is not added to the list, try refreshing the browser.

11 Click *Close*.

Replication

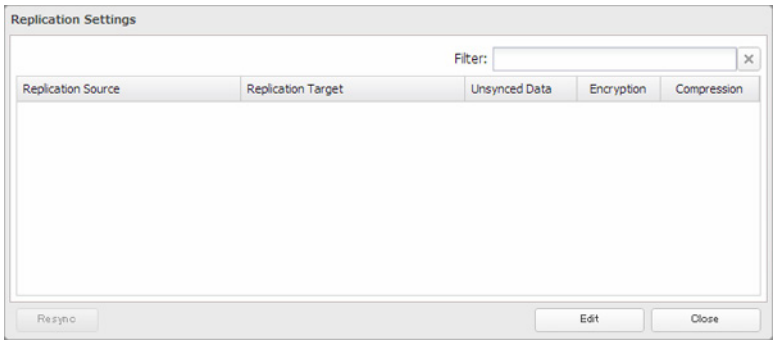
Replication copies all data from a share to a share on a different TeraStation. This is an easy way to configure a reliable system to provide data protection in the event your main TeraStation fails. To configure replication, connect an Ethernet cable to the LAN port of each TeraStation and follow the steps below.

1 In Settings, click *Backup*.



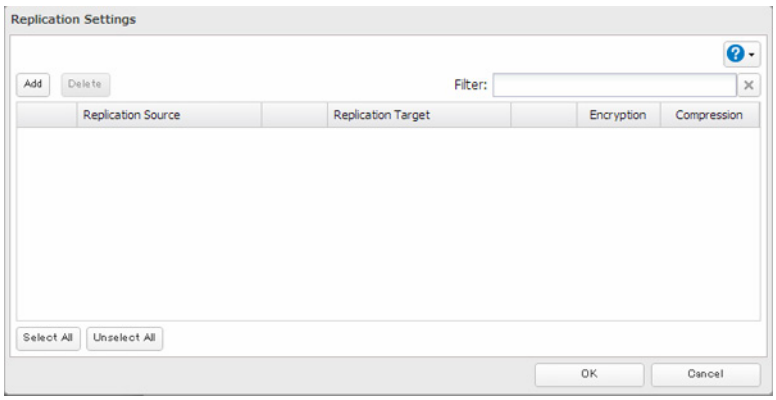
2 Click to the right of "Replication".

3 Click *Edit*.



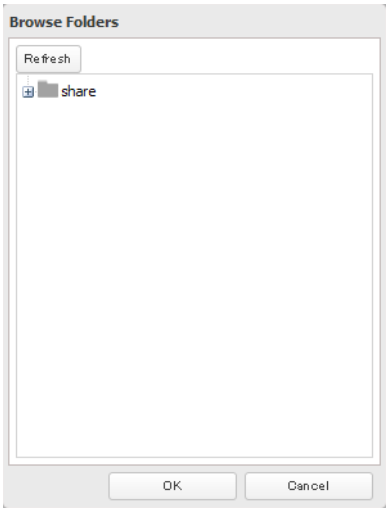
Note: Click *Sync* to copy all files to the replication target.

4 Click *Add*.



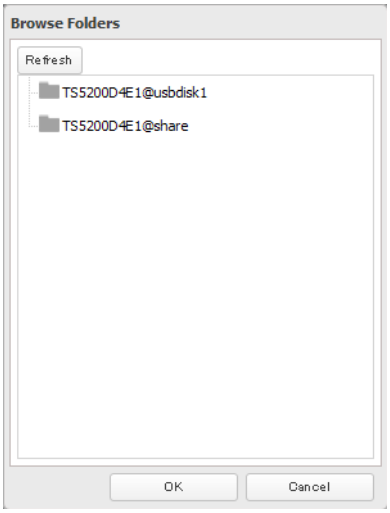
5 Click *Browse* under "Replication Source".

6 Select the shared folder that will be the replication source, then click *OK*.



7 Click *Browse* under "Replication Target".

8 Select the shared folder that will be the replication target, then click *OK*.



9 Click *OK*.

10 Click *Yes*.

Notes:

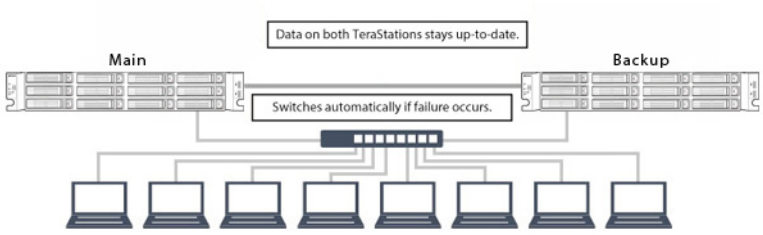
- During setup, you may choose to encrypt and/or compress replication data. Encrypted data will transferred securely on the network. Compressed data will ease network loading and is recommended for slow or heavily loaded network connections. Either will increase the CPU load on the source TeraStation. Encrypted and compressed data will be unencrypted and decompressed on the target TeraStation.
- For best results, add replication tasks one at a time. Multiple replication tasks may take some time to complete.
- A maximum of 64 shared folders can be configured for replication.
- Shared folders with a backup password set cannot be selected as replication targets.
- Replication source data is copied using a differential overwrite to the replication target folder. Note that any data that is not in the replication source will be overwritten.
- Replication can also be used to copy all data from a share to a share on an attached external drive. Format the drive with ext3 or XFS before using it for replication. Drives with FAT32 partitions are not supported with replica-

tion.

- You can select subfolders as the replication source. Folders whose names contain more than 80 alphanumeric characters cannot be selected.
- If a "Replication I33 ReplicateFailure" error occurs, navigate to *Backup - Replication* and click *Sync*.
- Don't use the same TeraStation for both failover and replication, or replication and Time Machine.
- Don't configure replication from one source folder to multiple target folders.
- If your TeraStation has more than 100 local users with an average of 8 characters or more per username, replication may fail. This bug will be fixed in a future firmware update.

Failover

With failover, two TeraStations are connected to the network for redundancy. If a problem occurs in the main TeraStation so that it can no longer be accessed, operation is automatically switched to the backup TeraStation.

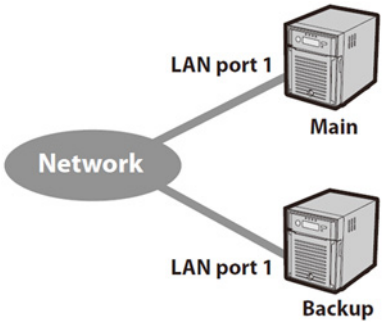


Note: Use identical model and capacity TeraStations for the main TeraStation and backup TeraStation. If the capacity of the main TeraStation is larger than that of the backup TeraStation, a "Replication I33 ReplicationFailure" error will occur.

Ethernet Cable Connection Methods

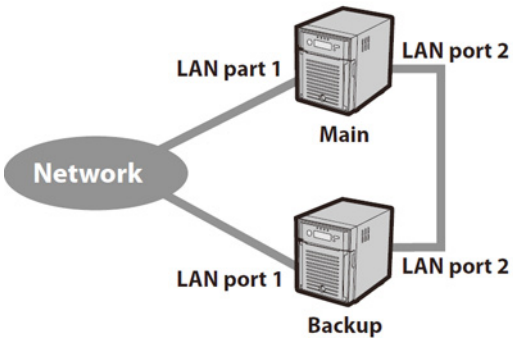
Two different configurations for failover are available. With the first setup, if the main TeraStation fails, the backup TeraStation will replace it completely, using the same name and IP address. The backup TeraStation is updated over normal network traffic.

Connecting to the network at LAN port 1 and setting failover at LAN port 1



With the second setup, the backup TeraStation and main TeraStation are connected by a second Ethernet cable connecting their LAN 2 ports. Updating is done over this dedicated network path, so updates are quicker and don't interfere with normal network traffic. With this setup, if the main TeraStation fails, the backup TeraStation will replace it by name, but will keep its original IP address.

Connecting to the network at LAN port 1 and setting failover at LAN port 2



The main and backup TeraStations should be the same model and capacity. Use fixed IP addresses for both TeraStations. Because the IP address of the TeraStation designated as the backup cannot be changed, set its IP address before configuring failover.

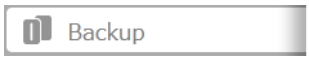
Using with UPS

Once failover is configured, you cannot set up a UPS for the backup TeraStation. Configure your UPS before configuring failover. UPS recovery can be configured for both the main TeraStation and the backup TeraStation. However, the UPS settings of the main TeraStation will not be copied to the backup TeraStation.

If the backup TeraStation is configured to sync with the UPS connected to the main TeraStation, then if the main TeraStation shuts down, the backup TeraStation will no longer be able to detect if there was a power outage. In this case, move the UPS communication cable from the main TeraStation to the backup TeraStation and reconfigure the UPS link settings.

Configuring Failover

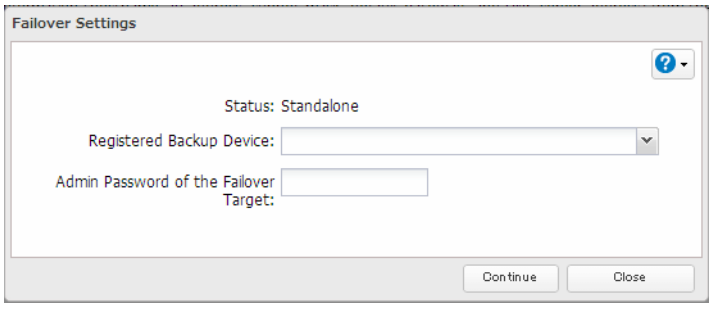
1 In Settings, click *Backup*.



2 Open *Failover*.

3 Click *Edit Failover Status*.

4 Select a TeraStation to be the target backup device.



5 Enter the administrator password of the target backup device, then click *Continue*.

6 If the administrator password is correct, the backup TeraStation will beep. In NAS Navigator2, both TeraStations will

show I51 messages and the backup TeraStation will also show an I48 message.

7 In the backup TeraStation's Settings, navigate to *Backup - Failover* and accept failover backup status. In the main TeraStation's Settings, the "This TeraStation is being configured as a failover main device." message will change to a "completed" message. Failover is set up.

Notes:

- Don't use the same TeraStation for both failover and replication, or failover and Time Machine.
- Ethernet frame size settings for both main and failover TeraStations should be 1500 bytes.
- If your TeraStation has more than 100 local users with an average of 8 characters or more per username, failover may fail. This bug will be fixed in a future firmware update.

Maintenance Mode

If failover is configured, change to maintenance mode temporarily before turning off the TeraStation or updating the firmware. Maintenance mode can be enabled and disabled at *Backup - Failover* in the main TeraStation's settings.

Service IP Address

The "service IP address" will be the new address of the backup TeraStation when it takes over operation from the main TeraStation.

If no service IP address is set, or a fixed IP address is set, an attempt is made to inherit the IP address from the main TeraStation.

Network Problems

If network problems occur, the following messages may appear in NAS Navigator2 even though neither TeraStation has failed. If this happens, disable and then reset failover.

- "FailOver I49 LostMainTarget" - This message (I49) is displayed in NAS Navigator2 for the backup TeraStation when operation switches from the main TeraStation to the backup TeraStation.
- "E27: LostBackupTarget" - This message (E27) is displayed in NAS Navigator2 for the main TeraStation if it is no longer able to detect the backup TeraStation on the network.

Backing Up Your Mac with Time Machine

Time Machine is a backup program included with OS X 10.5 or later. Configure your TeraStation as shown to use Time Machine.

1 In Settings, move the AFP switch to the position to enable AFP.

2 Choose *Folder Setup*.

3 Choose a shared folder as your backup destination for Time Machine.

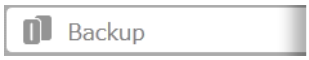
4 Click *Edit*.

5 Select *AFP (Mac)* to *LAN Protocol Support* and click *OK*.

6 Click *OK*.

7 Click *Close*.

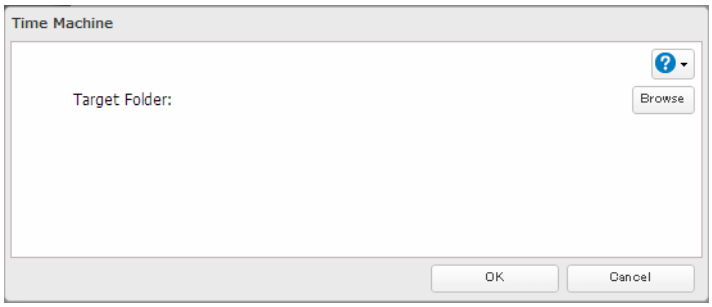
8 Click *Backup*.



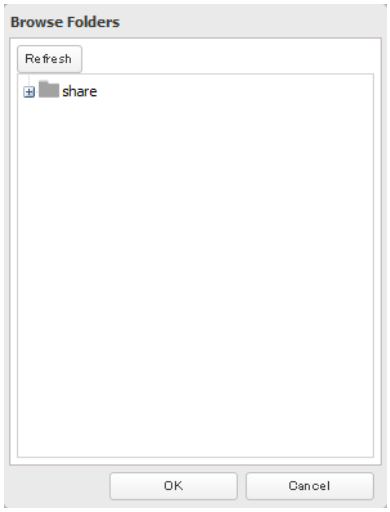
9 Click the icon to the right of "Time Machine".

10 Click *Edit*.

11 Click *Browse*.



12 Select the shared folder that you set in the previous step, then click *OK*.



13 Click *OK*.

14 Click *OK*.

15 Move the Time Machine switch to the position to enable Time Machine.

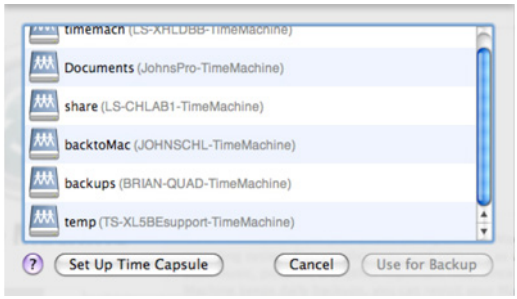
16 On the Mac, open *System Preferences*.

17 Click *Time Machine*.

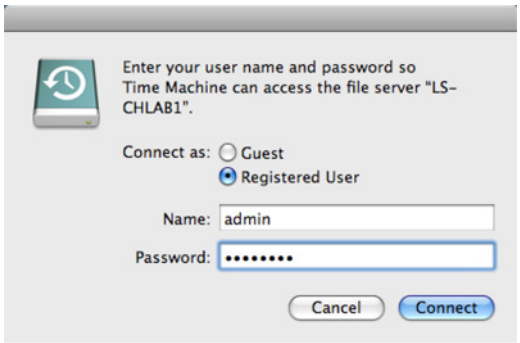
18 Click *Choose Backup Disk*.

Time Machine
Show All
Choose Backup Disk...
Time Machine
OFF
ON
Time Machine keeps copies of everything on your Mac, including system files, applications, and settings, as well as your music, pictures, and other important files. Since Time Machine keeps daily backups, you can revisit your Mac as it appeared in the past.
Show Time Machine status in the menu bar
Click the lock to prevent further changes.

19 Select the TeraStation, then click *Use for Backup*.



20 Enter a username and password with the rights to access the shared folder of the TeraStation, then click *Connect*.



Note: If access restrictions are not configured on the target share, log in with the administrator account. The default username and password for the administrator account are "admin" and "password". If access restrictions are configured, log in with an account with write privileges.

21 Time Machine will count down from 120 seconds, and the backup will begin.

Note: Because the backup operation is performed in the background, Mac OS operations and shutdown can be performed normally. If recovering data or setting items excluded from the backup, refer to the Mac OS help.

Amazon S3

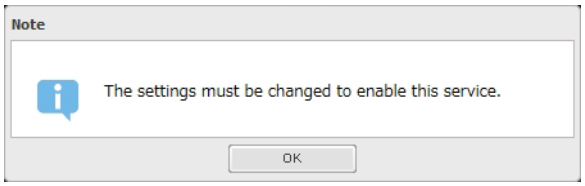
Amazon S3 (Amazon Simple Storage Service) is a fee-based online storage service provided by Amazon. Follow the steps below to configure your TeraStation for use with Amazon S3.

1 Create an account at the Amazon S3 website: http://aws.amazon.com/s3

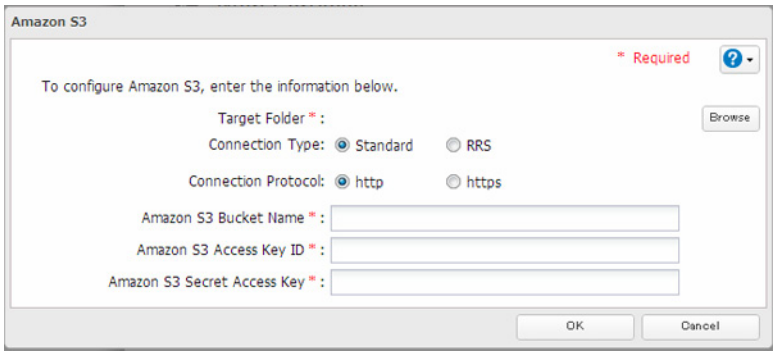
2 In Settings, click *Web Services*.

3 Move the Amazon S3 switch to the position to enable Amazon S3.

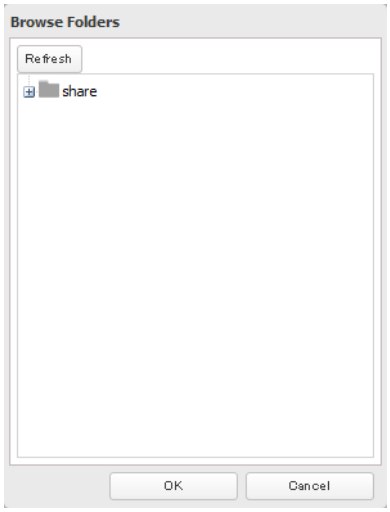
4 Click *OK*.



5 Click *Browse*.



6 Select the shared folder for remote replication, then click *OK*.



Note: This folder is used by Amazon S3. Files are not added to the selected folder and the amount of used space does not increase.

7 Enter the bucket name, access key ID, and secret access key of the Amazon S3 bucket, then click *OK*.

8 Amazon S3 is now enabled.

Notes:

- Amazon S3 is not compatible with Buffalo TurboPC EX. Uninstall TurboPC EX before using Amazon S3.
- Enter the path from the "Target Folder" field in a browser window to access the files saved to Amazon S3.
- To use after the network was temporarily disconnected, click *Remount*.
- If a file is added to the Amazon S3 bucket from a folder other than the TeraStation's Amazon S3 remote replication folder, it may take up to an hour for the file to appear in the TeraStation's Amazon S3 remote replication folder. However, when a file is added to the TeraStation's Amazon S3 remote replication folder, it immediately appears in the bucket.
- If you cannot enable Amazon S3, check the following:

  Can the TeraStation access the Internet? From *Network - Ping*, enter an IP address such as "8.8.8.8" (Google).

  Are all Amazon S3 credentials correct?

  Can you access the Amazon S3 website (http://aws.amazon.com/s3) from a browser on your computer?

Chapter 6 Remote Access

WebAccess

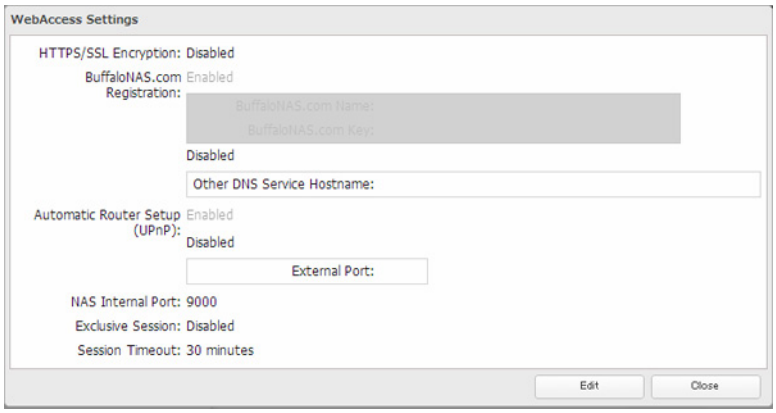
WebAccess is a program for accessing the files in the shared folder of your TeraStation from your computer, smartphone, or tablet through the Internet.

Note: Be careful configuring WebAccess. Certain settings can make the files in the shared folder available to anyone on the Internet, without any access restrictions.

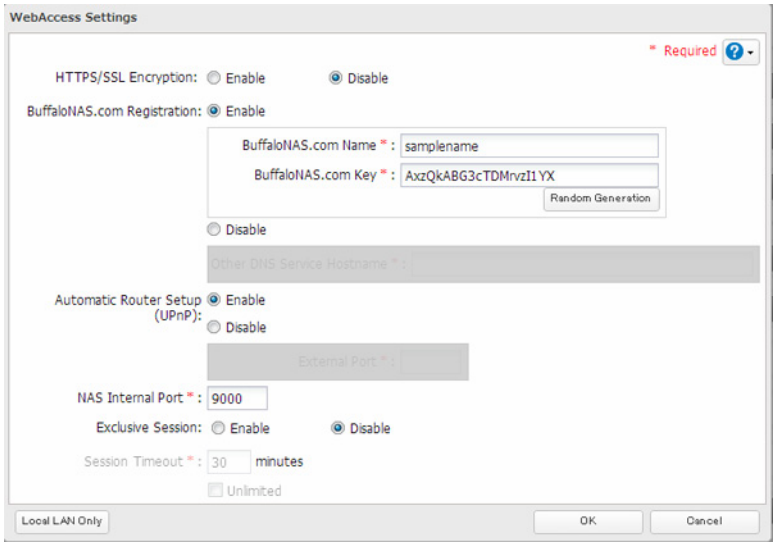
Configuration

1 Navigate to *File Sharing - WebAccess*.

2 Click *Edit*.



3 Configure the desired settings, then click *OK*.



- To use SSL encryption for more secure data transfers, enable "HTTPS/SSL Encryption".
- You may use the default BuffaloNAS.com registration, or disable to use a different DNS server.
- Choose a "BuffaloNAS.com name" for your WebAccess account. Names may use 3 to 20 alphanumeric characters, underscores (_), and hyphens (-).
- If "Exclusive Session" is enabled, users cannot log multiple computers into WebAccess. Only the last login will be active.
- Enter a time in minutes (1 to 120, or "Unlimited") before inactive users are logged out of WebAccess.

4 Click *OK*.

5 Move the WebAccess switch to the position to enable WebAccess.

6 Go to *Folder Setup*.

7 Select a shared folder to publish.

Notes:

- For best results, create a new dedicated share for WebAccess.
- When accessing shared folders through WebAccess from a remote location, the username and password may be required for certain operations. For best results, configure a user account with permissions on the WebAccess share before using WebAccess.

8 Click *Edit*.

9 Navigate to *File Sharing - Folder Setup* and choose the folder you will use for WebAccess. Enable "WebAccess LAN protocol support".

Notes:

- The following levels of security are available:
  Allow Anonymous - Anyone can access (view) shared folders.
  Allow All Groups and Users - All groups and users registered on the LinkStation or TeraStation can use WebAccess.
  Use Inherited Folder Permissions - Users and groups have the same access permissions with WebAccess that

they do locally. If access restrictions are not set for the shared folder, then this option will not be shown.

- When a user or group can access a folder through WebAccess depends on a combination of WebAccess settings and the shared folder's settings.

Folder Setup	WebAccess Public Mode	Allow Anonymous		Allow All Groups and Users		Use Inherited Folder Permissions	
	Folder Attribute	Read & Write	Read Only	Read & Write	Read Only	Read & Write	Read Only
WebAccess Account	Not logged in	R	R	-	-	-	-
	User with read & write access	R/W	R	R/W	R	R/W	R
	User with read-only access	R/W	R	R/W	R	R	R
	Group with read & write access	R/W	R	R/W	R	R/W	R
	Group with read-only access	R/W	R	R/W	R	R	R
	Other users	R/W	R	R/W	R	-	-

R: Read only, R/W: Read and write, -: No access

10 There are many ways to access WebAccess folders depending on your device.

- From a computer, supported browsers include Internet Explorer 8, Firefox 3.6, Safari 4, and later.
  Instructions: http://buffalonas.com/manual/en/
- To access from an iPhone, iPad, or iPod touch, install the "WebAccess i" application from the App Store.
  Instructions: http://buffalonas.com/manual/i/en/
- To access from an Android device, install the "WebAccess A" application from Google Play.
  Instructions: http://buffalonas.com/manual/a/en/
- To access from a Windows Phone, install "WebAccess" from the Marketplace.
  Instructions: http://buffalonas.com/manual/wp/en/

Note: If you are warned that your BuffaloNAS.com name is wrong when you access buffalonas.com, check your network settings. This can happen when your DNS or default gateway is not configured correctly. Confirm that the TeraStation can connect to the Internet, then reregister your BuffaloNAS.com name and reconfigure WebAccess.

WebAccess Remote

WebAccess Remote lets you open a shared folder on a remote TeraStation or LinkStation from Explorer, My Computer, or other file manager.

Note: To use WebAccess Remote, the following conditions must be satisfied.

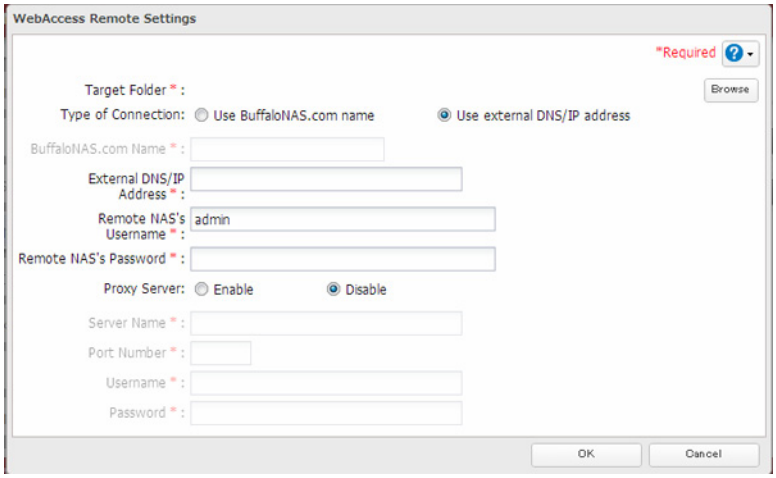
- You have TeraStations or LinkStation in two different locations, such as at home and at a remote location.
- WebAccess is enabled for both devices.

1 In Settings, click *Web Services*.

2 Click to the right of "WebAccess Remote".

3 Click *Edit*.

4 From "Target Folder", select the shared folder that will be connected.



Notes:

- The selected folder is used internally by "WebAccess Remote". Files are not added to this folder and the amount of used space does not increase.
- If using both Amazon S3 and WebAccess Remote, configure the same shared folder for both. Don't use different folders for these services.

5 You may choose to enter a BuffaloNAS.com name or an external DNS/IP address. If "Use external DNS/IP address" is selected, enter either the IP address of your DNS server, or the global IP address of the remote TeraStation's WebAccess.

6 Enter the remote TeraStation's WebAccess username and password.

7 Click *OK*.

8 Move the WebAccess Remote switch to the position to enable WebAccess Remote.

9 You can directly access the shared folder in the remote TeraStation by entering the path displayed in "Target Folder" into the address box in Explorer, My Computer, or other file manager.

Notes:

- TurboPC EX is not compatible with WebAccess Remote. Uninstall TurboPC EX from your computer before using WebAccess Remote.
- If no files and folders are displayed in the target folder, disable WebAccess Remote and Amazon S3, reboot the TeraStation, and turn on both services again.
- If you change the NAS internal port number from the default value (9000), enter the new port number after the external DNS/IP address with a colon. Example: http://buffalotech.com:9002

FTP

By default, the TeraStation's shares are only accessible by users connected to the same network or router as the TeraStation. The optional FTP server allows users outside the local network to access the TeraStation.

Note: FTP is intended for users who already have FTP client software and have experience with it.

1 In Settings, move the FTP switch to the position to enable FTP.

2 Open *Folder Setup*.

3 Choose a folder to enable remote FTP access on.

4 Click *Edit*.

5 Select read-only or read & write for the shared folder's attribute, check "FTP" under "LAN Protocol Support", then click *OK*.

Accessing the TeraStation with an FTP client

- To access the TeraStation via FTP, configure your FTP client software with the following settings:
  Hostname: IP address of the TeraStation
  Username: The TeraStation's username
  Password: The TeraStation's password
  Port: 21
- Shared folders connected by FTP are available from the "/mnt" directory. The default locations are:
  For RAID 0, RAID 5, or RAID 1:
  /mnt/array1/share
  /mnt/usbdisk1
  /mnt/usbdisk2
  For RAID 1 (two arrays):
  /mnt/array1/share
  /mnt/array2/share2
  /mnt/usbdisk1
  /mnt/usbdisk2
  For JBOD:
  /mnt/disk1/share
  /mnt/disk2/share2
  /mnt/disk3/share3
  /mnt/disk4/share4
  /mnt/usbdisk1
  /mnt/usbdisk2

Accessing the TeraStation with an Anonymous user:

- To allow anonymous access to your FTP share, check "FTP" in "LAN Protocol Support" and disable access restrictions.
- To access the TeraStation via anonymous FTP, configure your FTP client software with the following settings:
  Hostname: IP address of the TeraStation
  Username: anonymous
  Password: any character string
  Port: 21

Notes:

- If the TeraStation joins a domain, anonymous users cannot access it.
- If a file was created or copied by AFP, you may not be able to delete it using an FTP connection. If this occurs, use an SMB or AFP connection instead to delete the file.
- For FTP connections, make sure that the total filename including directory path is 250 single-byte characters or less.

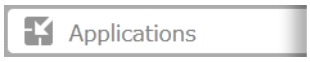
Chapter 7 BitTorrent

BitTorrent is a protocol for distributing large amounts of data efficiently. The information in this chapter is for users who are familiar with BitTorrent.

Note: Use compatibility mode to use Download Manager with Windows 8.1 or Windows 8.

Configuration

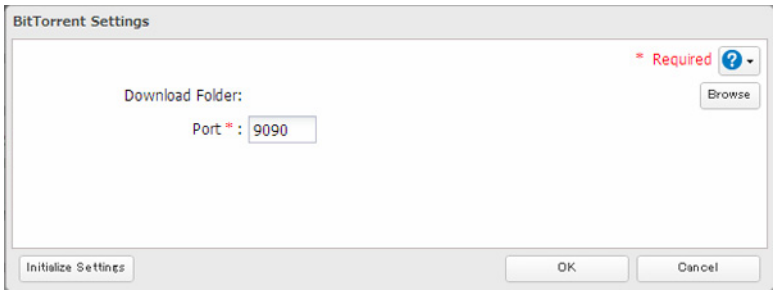
1 In Settings, click *Applications*.



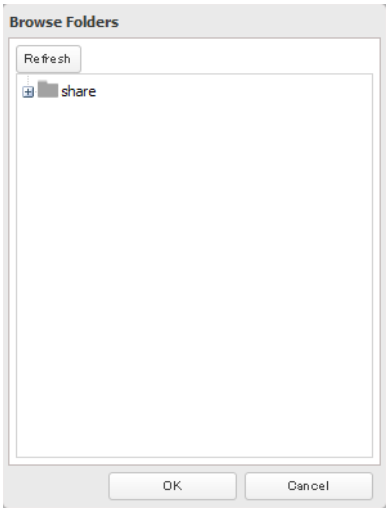
2 Click the icon to the right of "BitTorrent".

3 Click *Edit*.

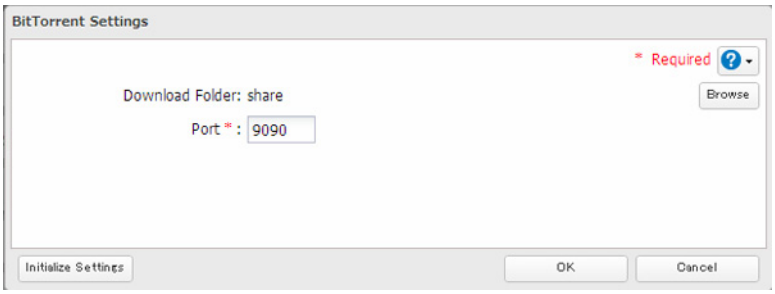
4 Click *Browse*.



5 Select the shared folder where the downloaded file will be saved, then click *OK*.



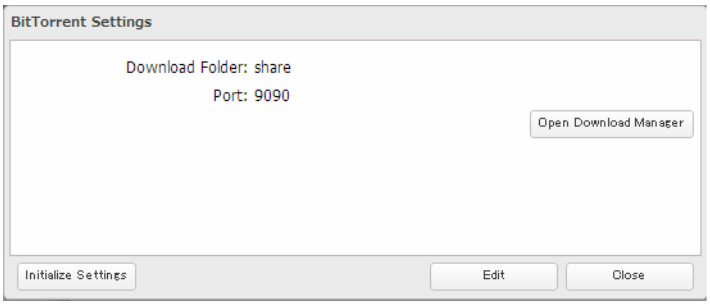
6 Click *OK*.



7 Move the BitTorrent switch to the position to enable BitTorrent.

8 Click the icon to the right of "BitTorrent".

9 Click *Open Download Manager*. The default username is "admin" and the default password is blank (no password).

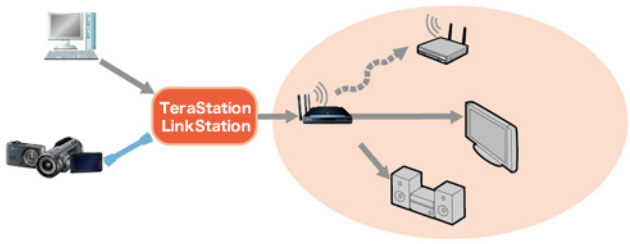


10 The download manager will open.

Chapter 8 Multimedia

DLNA

DLNA is a set of guidelines for sharing digital media. The TeraStation includes a DLNA server compliant with the DLNA guidelines. The movies, photos, and music saved on this product can be played back on DLNA-compliant TVs, stereo equipment, game consoles, and other devices within the network.



Configuration

1 Navigate to *File Sharing - Folder Setup*.

2 Select the folder that you want to share with media players and other DLNA-compatible devices.

3 Click *Edit*.

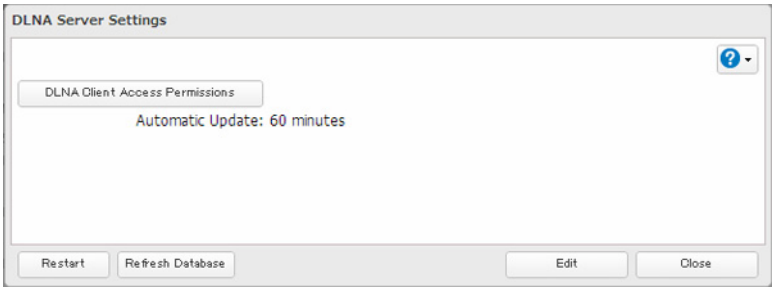
4 Enable "DLNA" under "LAN Protocol Support", then click *OK*.

5 Click *Services*.

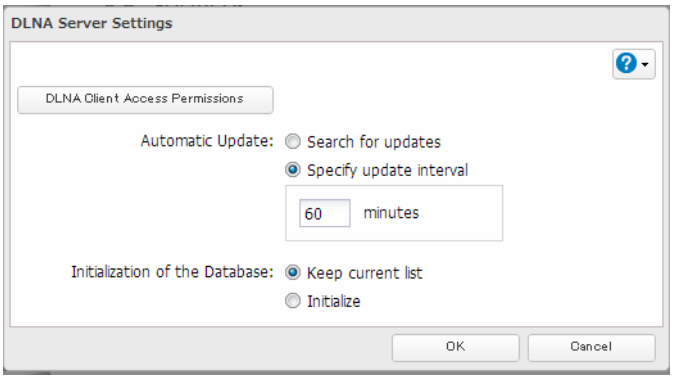
6 Move the DLNA switch to the position to enable DLNA.

7 Click the icon to the right of "DLNA Server".

8 Click *Edit*.



9 Select an interval for DLNA server database updates and click *OK*.



Playing Files

To play back content from a DLNA-compatible device:

1 Connect the DLNA-compatible device to the same network as the TeraStation and turn it on.

2 Select the TeraStation in the software of the DLNA-compatible device.

3 Select the content to be played back.

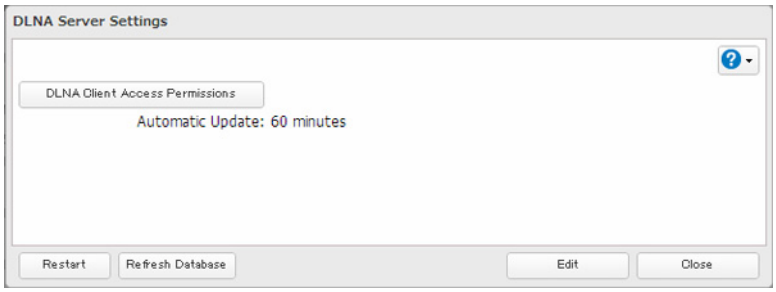
Connected DLNA-compatible Devices

Follow the procedure below to view the DLNA-compatible devices connected to your TeraStation.

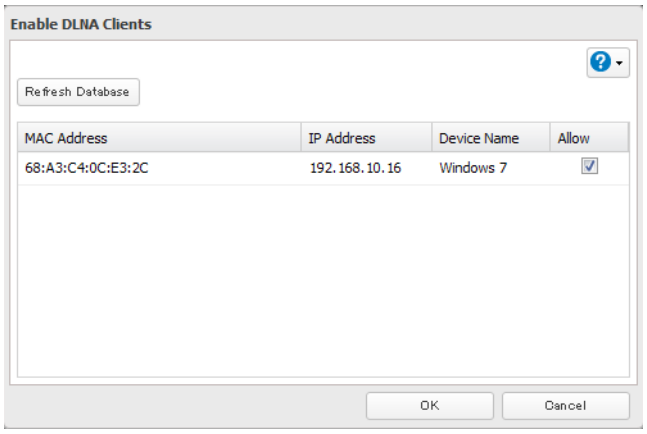
1 In Settings, click *Services*.

2 Click the icon to the right of "DLNA Server".

3 Click *DLNA Client Access Permissions*.



4 A list of the MAC addresses, IP addresses, and device names of the DLNA-compatible devices connected to the same network as the TeraStation is displayed. If your device is not listed, click *Refresh Database*.



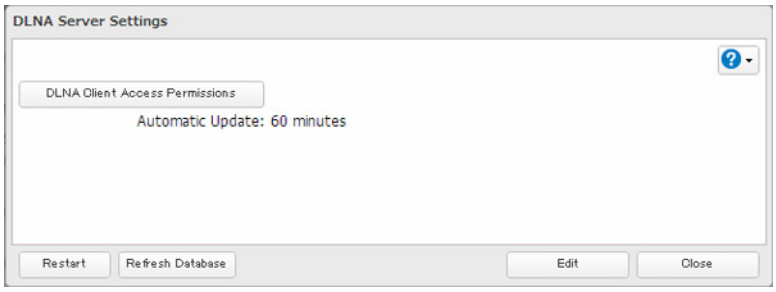
Streaming to DLNA-compatible Devices

When new movies, photos, and music files are added to the TeraStation's DLNA folder, the database must be updated before the new file scan be streamed. By default, the database is updated at startup and again every 60 minutes. You can change this interval or update the database manually.

1 In Settings, click *Services*.

2 Click the icon to the right of "DLNA Server", then click *Edit*.

3 You may change the update interval, or select *Refresh Database* to update the database immediately.



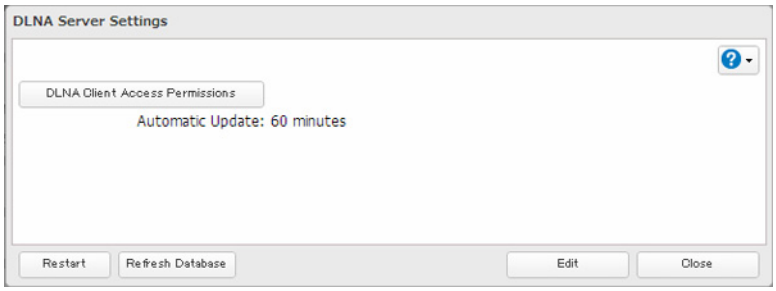
Disabling Playback from Specific Devices

You may block specific DLNA devices from playing back media content.

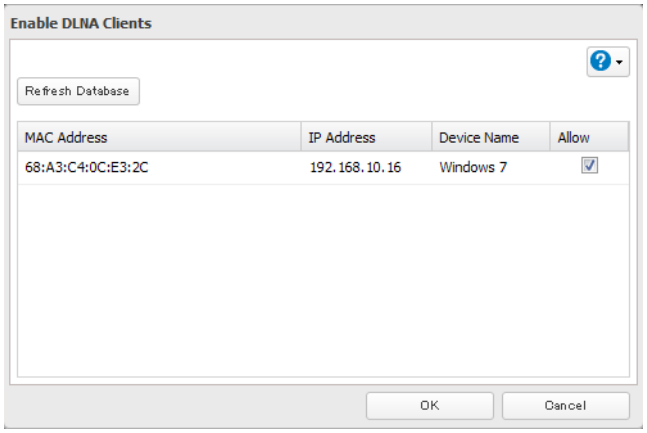
1 In Settings, click *Services*.

2 Click the icon to the right of "DLNA Server".

3 Click *DLNA Client Access Permissions*.



4 Uncheck the devices you do not want to allow to play media and click *OK*.



Supported File Types

The TeraStation supports DLNA streaming of files with the extensions below.

Types	File Extensions

Video files	.avi, .divx, .asf, .mpg, .mpe, .m1v, .vob, .mts, .m2ts, .m2t, .mpeg, .mpeg2, .vdr, .spts, .tp, .ts, .3gp, .mov, .m4v, .wmv, .dvr-ms, .xvid, .mp4
Picture files	.jpg, .jpeg, .gif, .png, .tif, .tiff, .yuv, .bmp
Music files	.mp3, .mpa, .wma, .aac, .apl, .ac3, .lpcm, .pcm, .wav, .m3u, .m4a, .mp4, .3gp, .m4b, .aif, .aiff, .flac, .ogg, .mp2, .mp1, .mp4

iTunes Server

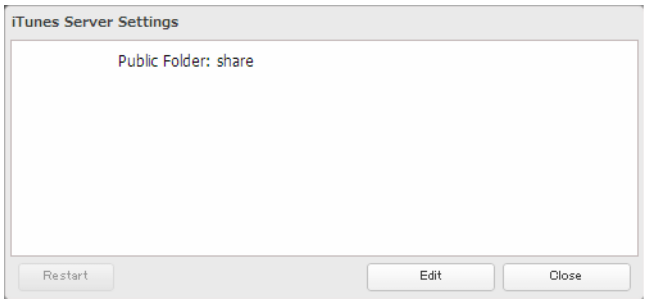
If the iTunes server is enabled, computers on your network with iTunes can play music files stored on the TeraStation and transfer them to iPod, iPhone, and iPad devices. The iTunes server supports playback from up to five computers.

Configuration

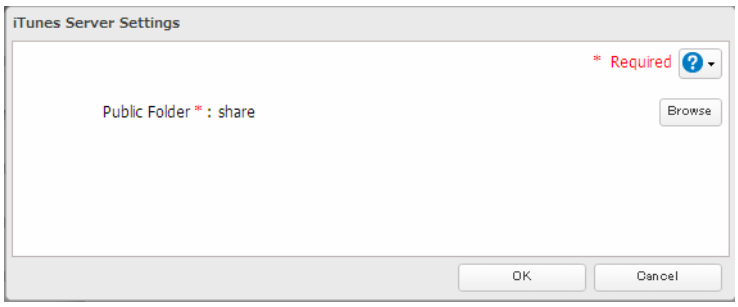
1 In Settings, click *Services*.

2 Click the icon to the right of "iTunes Server".

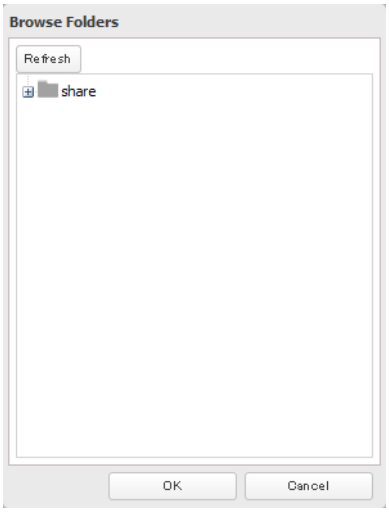
3 Click *Edit*.



4 Click *Browse*.



5 Select the shared folder that you want to make available to iTunes, then click *OK*.



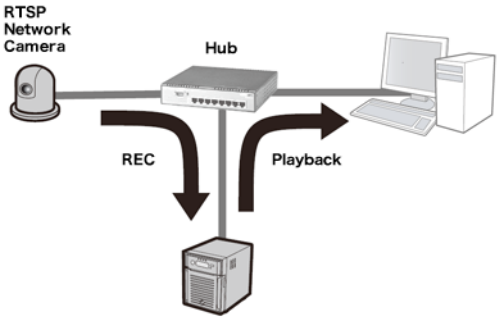
6 Click *OK*, then *OK* again.

7 Move the iTunes server switch to the position.

Chapter 9 Surveillance Server

Overview

The TeraStation supports streaming video from RTSP (Real Time Streaming Protocol) network cameras.



Getting Started

The following items are required:

- TeraStation with surveillance camera support
- Supported network camera
- Ethernet cable
- Ethernet hub
- Computer

  Supported Operation Systems: Windows 7 (64-bit or 32-bit), Windows Vista (64-bit or 32-bit), Windows XP SP 3, Windows Server 2008 SP 2 (64-bit or 32-bit), Windows Server 2003 SP 2, OS X 10.5.8 or later

  CPU: Intel Dual-core 2.20 GHz or faster

  Hard drive: 10 GB or more of available space

  RAM: 2 GB or more

  Note: Live Viewer requirements:
  Supported OSs: Windows 7 (64-bit or 32-bit), Windows Vista (64-bit or 32-bit), Windows XP SP 3
  CPU: Quad-core 2.33 GHz or faster
  Hard drive: 10 GB or more of available space
  RAM: 2 GB or more

  Surveillance cameras cannot be used if failover is configured. Also, failover cannot be used if surveillance camera functionality is enabled.

Installing Client Tools

Download the client tools below from www.buffalotech.com and install them on your computer.

Camera Policies - Registers that a network camera is connected and ready to record.

Live Viewer - Lets you view video as it is being recorded. With some network cameras, pan, tilt, zoom, focus, and other remote operations may be unavailable.

Data Service Policies - Used to move, back up, and delete recorded video data.

Vault Admin - Used to perform license registration, self-diagnosis, check the remaining disk space, and other operations.

Surveillance Video Manager - Used to view recorded video data, perform searches, export, and other operations.

Network Activity - Displays the operating status of the TeraStation.

Notes:

- Use an account with administrator rights to install software.
- To play recorded video, install VLC media player 1.11–1.13 or Apple QuickTime 7 or later on your computer. VLC media player 2.0.x doesn't work with some network cameras. For network cameras that record in MPEG-4 format, VLC media player is recommended.
- If VLC media player is installed, use the default installation location (C:\Program Files (x86)\VideoLAN\VLC in Windows 7 64-bit or the Application folder in Mac OS).
- If surveillance cameras or client tools installed under C:\Program Files (x86)\BUFFALO\SurveillanceServer\Bin) are blocked due to the OS firewall, refer to the OS help for instructions about how to disable the firewall.
- Install Client Tools on one or more computers connected to the same network as the network camera(s) and the TeraStation. Surveillance camera settings are shared for all cameras on the network.

Connecting Devices to the Network

Connect the following devices to the network.

- A TeraStation that supports surveillance cameras
- A compatible network camera
- A computer with the above client tools installed

Notes:

- Connect all devices on the same network subnet.
- Set the TeraStation's and network camera's time settings to the correct time. By default, the TeraStation adjusts its clock automatically by using a default NTP server. This NTP Server belongs to Internet Multi Feed Inc. For more information,visit *www.jst.mfeed.ad.jp*. You can select a different NTP Server by clicking *Name/Time/Language* on the "Management" screen. The *Name/Time/Language* screen opens.
- Click *Time*.
- Click *Edit*.
- Uncheck *Use Default NTP Server* and enter a new NTP IP address.
- Click *OK*.

If NTP is not used,disable it and enter the time and date manually. Click *Use Local Date/Time* to import the time and date from your computer.

In certain cases, the DNS server address must be set in order to access the NTP server.

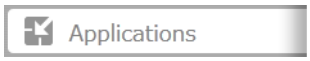
- Use the dedicated utility provided with the network camera or other program to confirm that the network camera operates properly.

Enable the Surveillance Camera

Enable surveillance camera in Settings.

Note: First, complete the initial settings for the TeraStation and the network camera. For details on the procedure, see the manual supplied with the device.

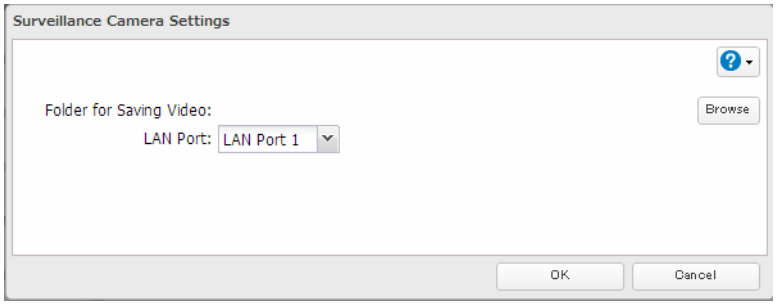
1 In Settings, click *Applications*.



2 Click the icon to the right of "Surveillance Cameras".

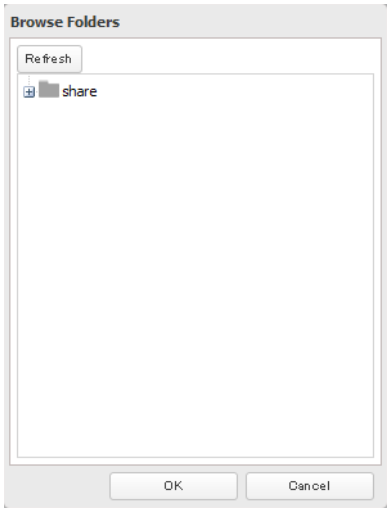
3 Click *Edit*.

4 From "LAN Port", select the LAN port connected to the same network as the network camera and computer where the client tools are installed.



5 Click *Browse*.

6 Choose a folder for recorded video, then click *OK*.



7 Click *OK*, then *OK* again.

8 To enable surveillance cameras, change the switch to .

Notes:

- If the target shared folder specified as the storage location for recorded video is deleted, the surveillance camera is automatically disabled.
- Do not directly edit recorded video data in the shared storage folder. If a file is directly edited, the surveillance camera software may no longer operate properly.
- Do not duplicate or back up the shared storage folder with the built-in utilities in Settings. A separate backup license must be purchased to back up this data to another TeraStation.
- The client tools can only be used with the LAN connected to the selected LAN port.

Users with Two or More Network Cameras

In the default settings, only one network camera can be used. To use two or more network cameras, additional licenses (sold separately) must be purchased and registered.

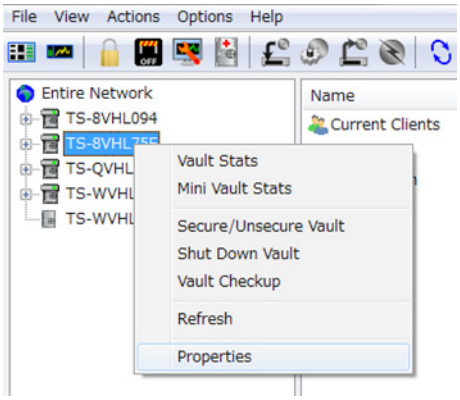
Enabling the Free License

Your TeraStation comes with a license for one surveillance camera. Follow the procedure below to enable the included license.

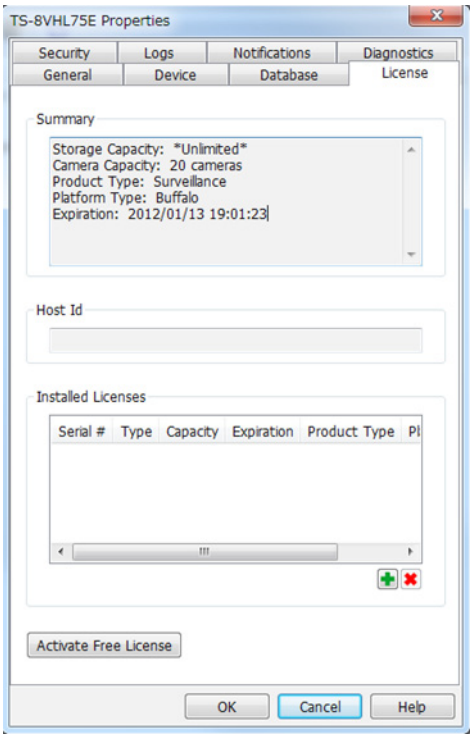
1 Connect the TeraStation to the Internet.

2 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Vault Admin*.

3 Select the TeraStation where you want to add the license, right-click it, and click *Properties*.

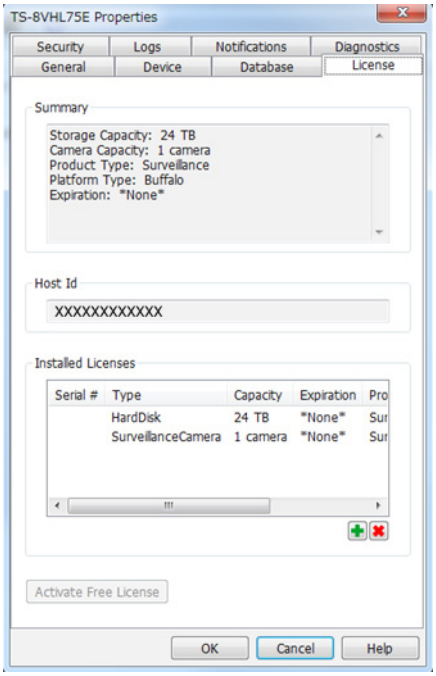


4 Open the *License* tab, then click *Activate Free License*.



To deactivate the license, click .

5 Check that the "SurveillanceCamera 1 camera" and "HardDisk" were added to "Installed Licenses".



The free license is now enabled.

Registering the Recording Policy of the Network Camera

Register the network camera that is used.

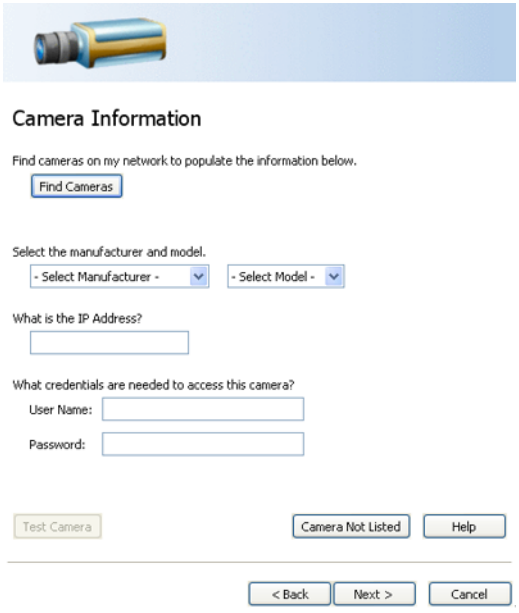
1 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Camera Policies*.

2 Click the icon.

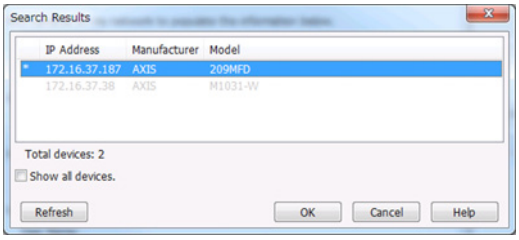
3 Click *Next*.

Welcome to the Add Camera Wizard
This wizard helps you add and schedule a new camera.
You may need to run this wizard with administrative rights.
To continue, click Next.
About
Help
< Back
Next >
Cancel

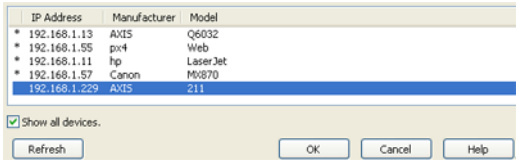
4 Click *Find Cameras*.



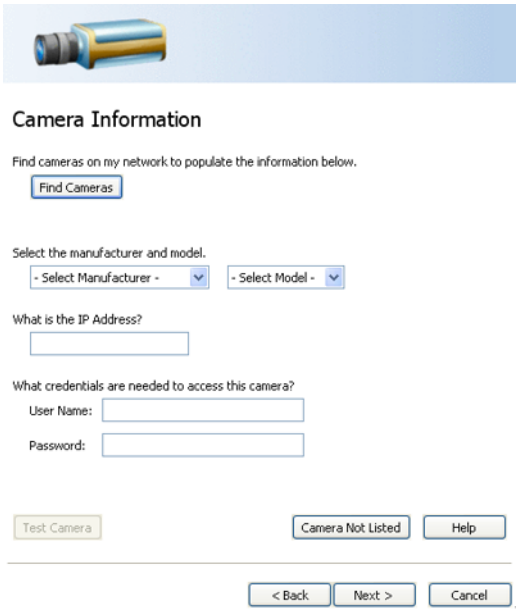
5 Select the detected network camera, then click *OK*.



Note: Network cameras that are already in use are indicated by an asterisk (*) and they are gray.

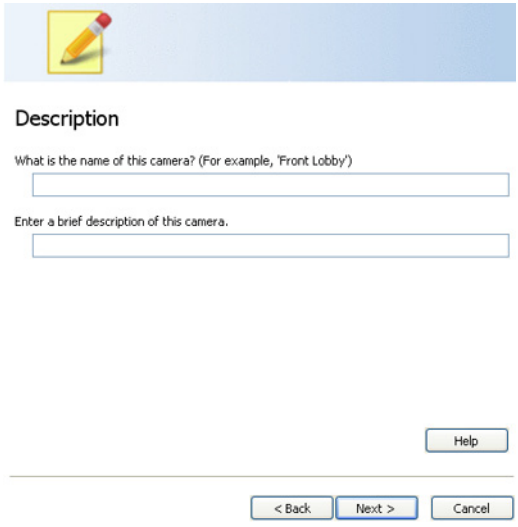


6 Enter the username and password, then click *Next*.



Note: Clicking *Test Camera* runs an operational check of the network camera.

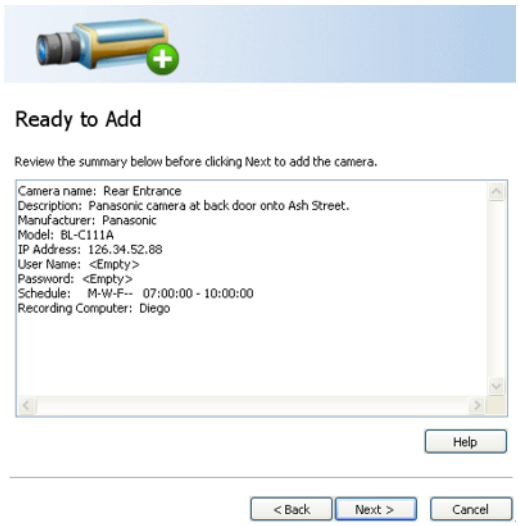
7 Enter the description, then click *Next*.


Description
What is the name of this camera? (For example, 'Front Lobby')
Enter a brief description of this camera.
Help
< Back
Next >
Cancel

8 Select the recording schedule, then click *Next*.

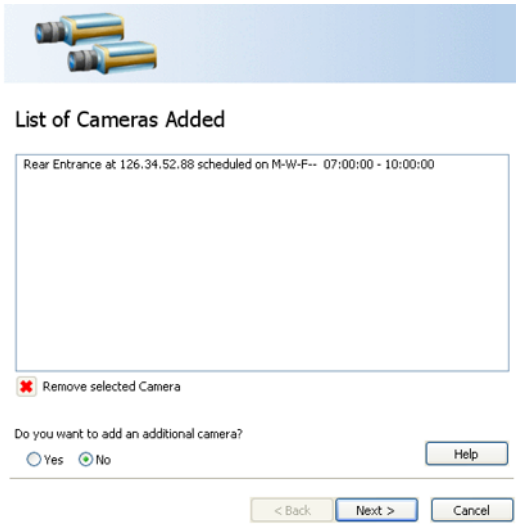
9 Select the TeraStation where the video will be recorded, then click *Next*.

10 Check the registration information, and if it is correct, click *Next*.

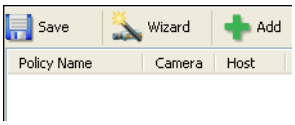


11 Click *Next*.

An additional network camera can be registered by selecting "Yes" when asked "Do you want to add an additional camera?"



12 Click *Save*.



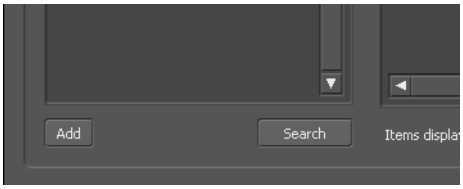
Recording will begin. You've now registered the recording policy of the network camera.

Checking Recording

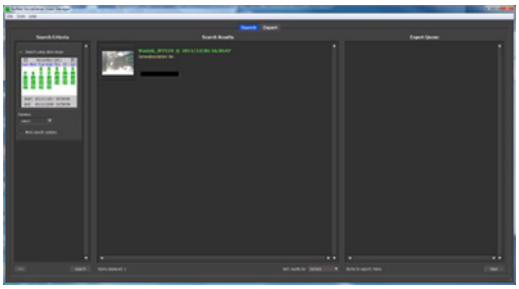
Wait at least 15 minutes after registering the recording policy before performing this procedure. To check that recording is working correctly, follow the procedure below.

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Surveillance Video Manager*.

2 Click *Search*.



3 Recorded video clips are shown in the center of the screen. Click a video clip to start playback.



This completes checking recording.

Email Error Notification

You may configure the TeraStation to send you an email notification when the available space for recording is low, or when recording fails due to a camera malfunction, network disconnection, or other cause.

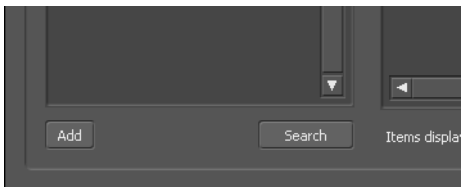
Configuration

Viewing Saved Video

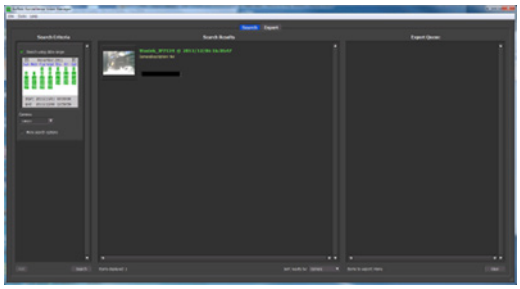
Follow the procedure below to view recorded data saved in the TeraStation.

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Surveillance Video Manager*.

2 Click *Search*.



3 Video clips are shown in the search results at the center of the screen. Click the clip to start playback.

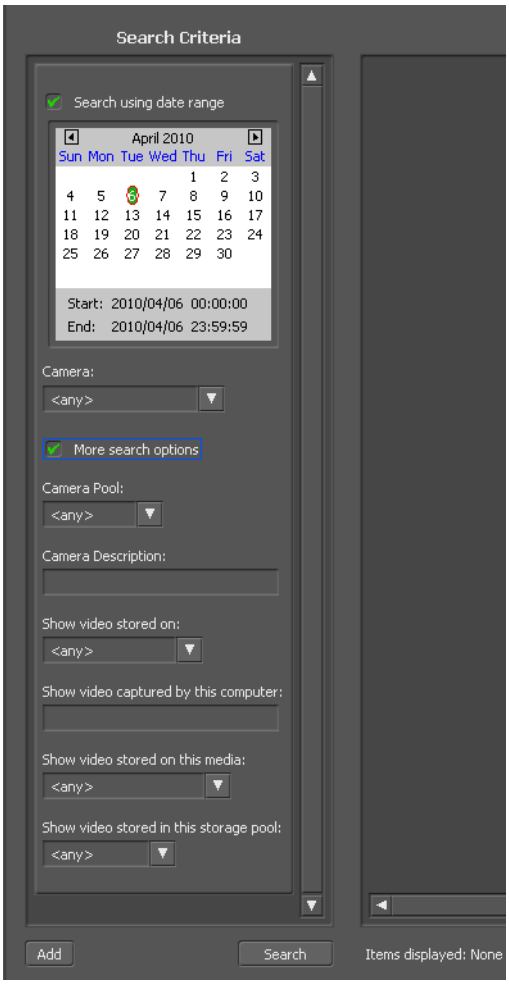


Export Recorded Data as a MOV Video File

To export recorded data saved to the TeraStation as a MOV format video file:

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Surveillance Video Manager*.

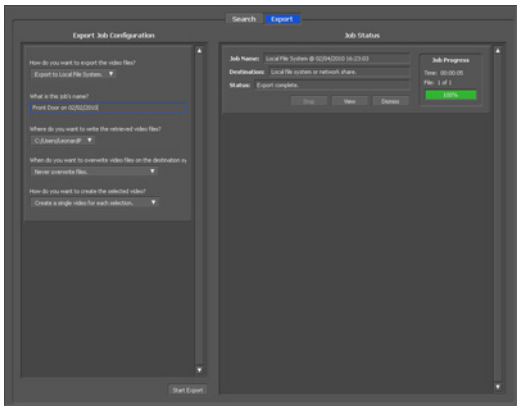
2 Select the search criteria on the left side of the search screen, then click *Search*.


Search Criteria
Search using date range
April 2010
Sun Mon Tue Wed Thu Fri Sat
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30
Start: 2010/04/06 00:00:00
End: 2010/04/06 23:59:59
Camera:
<any>
More search options
Camera Pool:
<any>
Camera Description:
Show video stored on:
<any>
Show video captured by this computer:
Show video stored on this media:
<any>
Show video stored in this storage pool:
<any>
Add
Search
Items displayed: None

3 The search results are displayed. Click a thumbnail to start the media viewer.

4 Select the section to export and click *Export*. This will register the video to the export queue.

5 Open the Export screen, register the export information from "Export Job Configuration", and click *Start Export*. The video is exported in MOV format.



This completes exporting video in the MOV format.

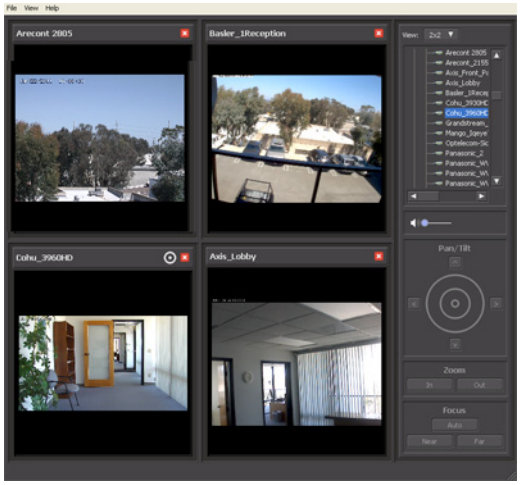
Viewing Video Real-time

Follow this procedure to view the video as it is being recorded by the network camera.

Note: Live Viewer data cannot be viewed.

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Live Viewer*.

2 Registered network cameras are listed in the Camera folder on the right side of the screen. To view content of a video that is currently being recorded, double-click the camera whose video you want to view or drag to a frame of the camera viewer on the left side of the screen.



This completes viewing current video.

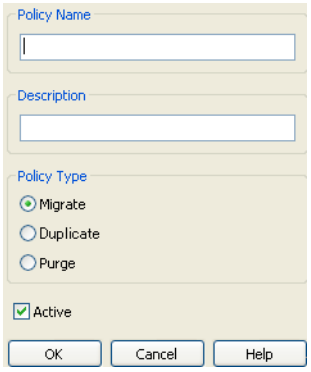
Moving Recorded Video Data to Another TeraStation

Follow the procedure below to move (migrate) the recorded video data to another TeraStation.

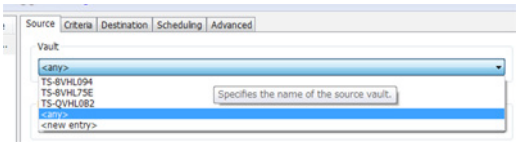
Note: A separate Surveillance Server License Pack must be purchased to do this.

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Data Service Policies*.

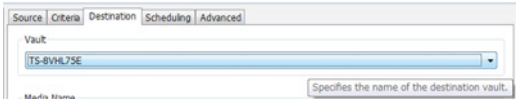
2 Click , and when the Create a Policy screen is opened, enter "MigrateTest" into the "Policy Name" field, select *Migrate*, and click *OK*.



3 Click the *Source* tab. Under "Vault", select the TeraStation where the recorded video data is saved. Select *any* to migrate recorded data on all network-connected TeraStations.



4 Click the *Destination* tab to select which TeraStation you want to move the data from "Vault" off of.



5 Set the migration date and time on the *Scheduling* tab.
To execute migration every hour, select *Repeatedly at a defined interval* and *Every 1 hour*.

6 Click , and register the policy.

This completes the settings for moving recorded video to another TeraStation.

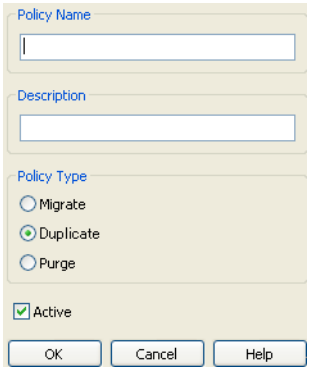
Backing Up Recorded Video to Another TeraStation

Follow this procedure to back up recorded video data to another TeraStation.

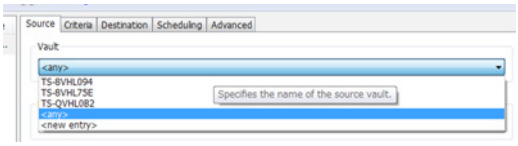
Note: A separate Surveillance Camera License Pack must be purchased to do this.

1 Click *Start - BUFFALO - BUFFALO Surveillance Server - Data Service Policies*.

2 Click and when the Create a Policy screen opens, enter "DuplicateTest" into the "Policy Name" field, select *Duplicate*, and click *OK*.

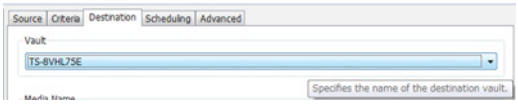


3 Click the *Source* tab and select the TeraStation where the recorded video data is saved under "Vault".



Note: If *any* is selected, recorded data for all TeraStations connected to the network will be backed up.

4 Click the *Destination* tab, then select the TeraStation where you want to move the data from "Vault".



5 Set the job execution date and time from the *Scheduling* tab.
For example, the settings below are made to repeatedly execute the backup job every hour.
Select *Repeatedly at a defined interval* and *Every hour*.

6 Click and register the policy.

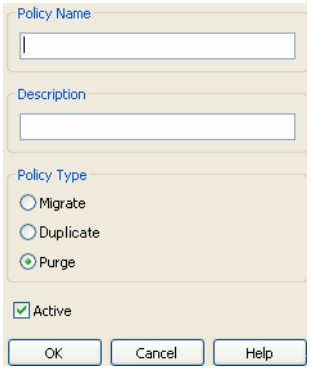
This completes the settings for backing up video to another TeraStation.

Automatically Delete Old Data when Space is Low

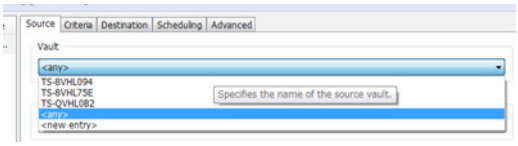
Follow the procedure below to delete (purge) recorded video starting from the oldest when available space for recording video becomes low.

1 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Data Service Policies*.

2 Click , and when the Create a Policy screen is opened, enter "PurgeTest" into the "Policy Name" field, select *Purge*, and click *OK*.



3 Click the *Source* tab and select the TeraStation on which recorded video is saved under "Vault".

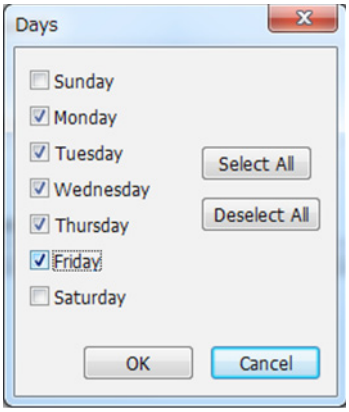


4 Open the *Criteria* tab, and under "Miscellaneous Options", set *Watermark: High* and *Watermark: Low*.
For example, the settings below delete old data when the amount of used media space exceeds 80% until it drops to 40%.
Set Watermark: High to "80" and Watermark: Low to "40".

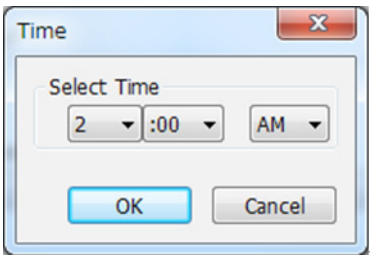
5 Set the job execution date and time from the *Scheduling* tab. This example shows a job to be executed at 2:00 am on weekdays.

- Select *On selected days each week*.

- Select every day between Monday and Friday.



- Select "2:00" and "AM", then click *OK*.



6 Click and register the policy.

This job is now set up to run at 2:00 AM Monday to Friday.

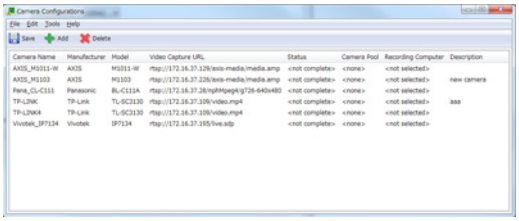
Changing Where Recorded Video Is Saved

Follow this procedure to change the TeraStation to which video is saved.

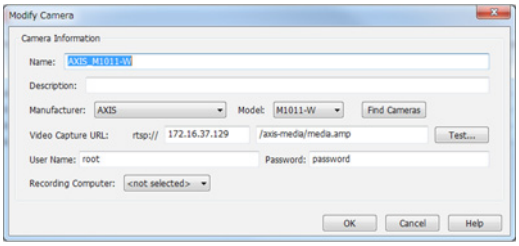
1 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Camera Policies*.

2 Click the icon on the tool bar and open the "Camera Configuration" screen.

3 Double-click the camera to which video will be saved. This opens "Modify Camera".



4 Select the TeraStation you want to quit using as the "Recording Computer" and click *OK*.



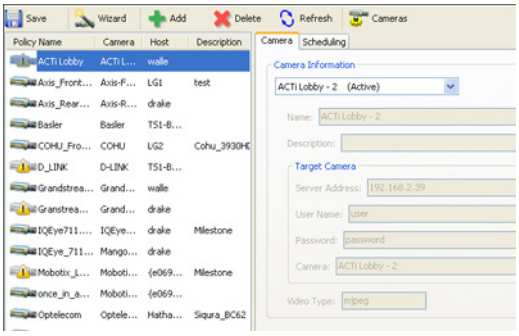
5 Click and register the policy.

This completes changing the TeraStation where recorded video is saved.

Client Utilities

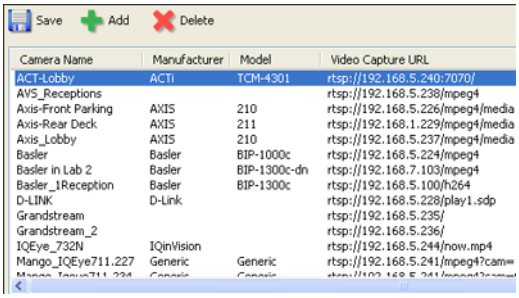
Camera Policies

Camera Policies is a software program that registers the network camera that will be used and starts video recording.

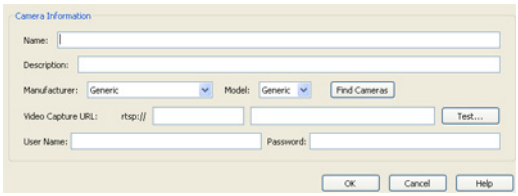


Click to start the wizard where registration of network cameras and the recording schedule are performed.

Click to start the camera configuration screen where network cameras are registered.



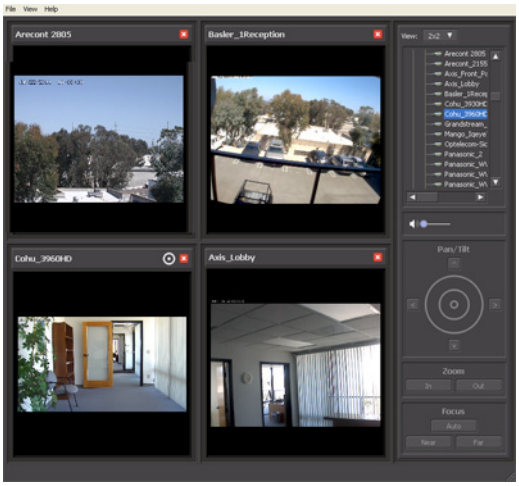
Click to start a new registration screen for an additional network camera. You can also register the camera and define the recording video policy.



Live Viewer

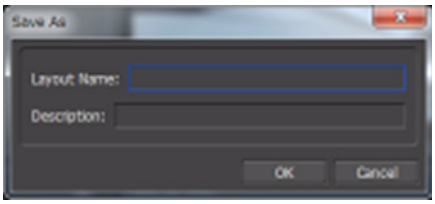
Live Viewer allows you to view video currently being recorded by a network camera.

Note: To view the current video, the network camera must be registered in Camera Policies.



- The layout of the camera view (numbers of rows and columns) and registered network cameras are displayed in the panel on the right side of the screen.
- The camera view (live video) is displayed on the left side panel. In the default setting, a 2x2 camera view is displayed. A layout view with up to 4x4 cameras can be displayed.
- Double-clicking the network camera name or dragging to the camera view frame enables viewing of the current video that is being recorded by the network camera.

The layout can be saved from "View" menu - "Save Layout As".

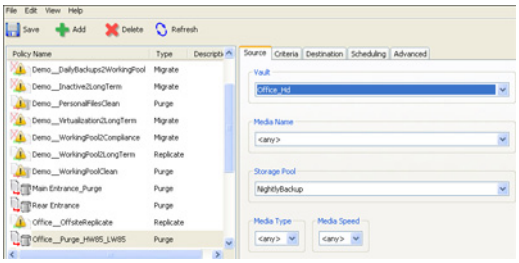


Data Service Policies

Data Service Policies is a software program for creating data service policies. The policy types that can be created are shown below.

Note: To use migration and duplication, an additional backup license must be purchased.

Policy Type	Action
Migration	Moves recorded video data to another TeraStation
Duplication	Copies recorded video data to another TeraStation and synchronizes the data.
Purge	Deletes the recorded video data.



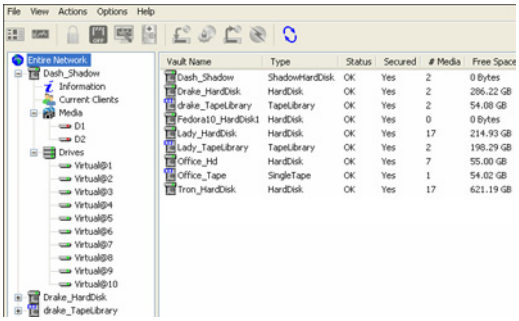
The right side of the screen includes tools for creating and updating data service policies. The left side of the screen shows an overview of all data service policies.

Notes:

- If ⚠ is displayed for a policy in the left-side frame, the policy is disabled.
- Surveillance server functionality must be enabled beforehand for the TeraStation where migration or duplication files will be saved.

Vault Admin

Vault Admin is a software program for managing surveillance camera resources.



Operations are performed from the tool bar located in the top section of the screen.

The icons and their functions are shown below.

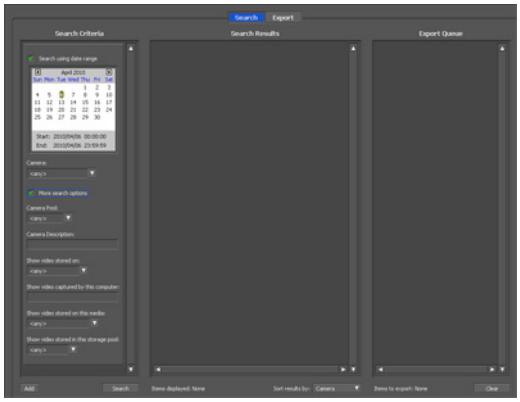
Icon	Description

	Starts “Mini Vault Status” for enabling the display of basic monitoring information.
	Sets the security status.
	Shuts down or restarts a portion (Vault) of the surveillance cameras.
	Changes the properties.
	Performs a diagnosis of the surveillance camera.
	Loads a media device.
	Prepares a media device.
	Unloads a media device.
	Erases a media device.
	Refreshes the current screen.

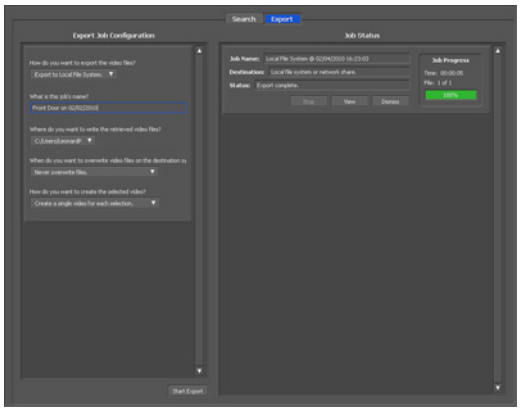
Surveillance Video Manager

Surveillance Video Manager is a software program for performing searches and exporting of recorded video data.

Search Window

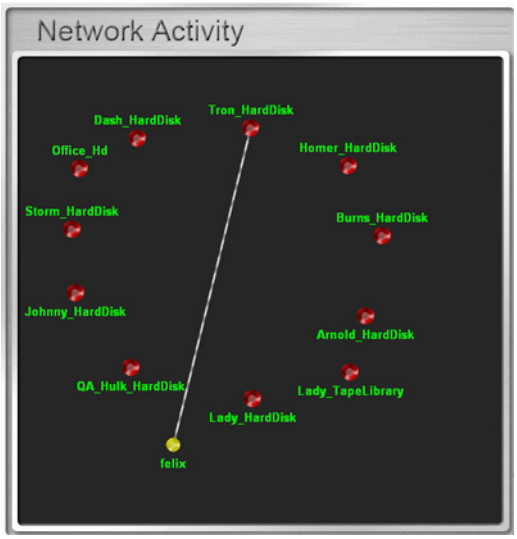


Export Window



Network Activity

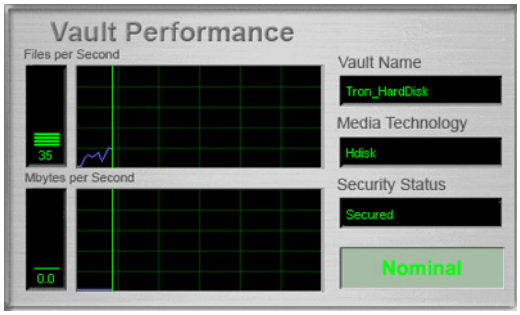
Network Activity is a software program that displays the TeraStations on which surveillance cameras are operating on the network, in real time and in graphical form.



All clients and TeraStations located on the network are indicated by and labels. These can be moved by dragging and dropping them. Clients are displayed only when a job is being executed and activities are indicated by a line linking the client and TeraStation.

Mini Vault Stats

Double-clicking the icon for a TeraStation on "Network Activity" starts "Mini Vault Stats". "Mini Vault Stats" shows the network traffic in graphical form.



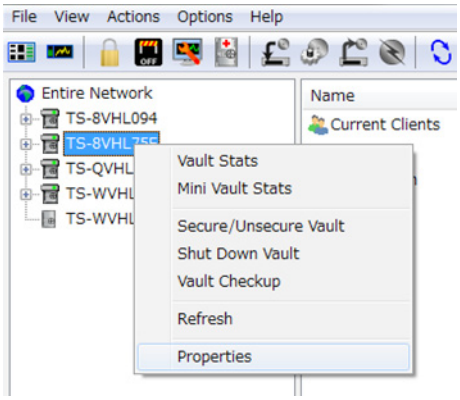
Activating Additional Licenses

Purchasing an additional license (sold separately) enables you to connect and use two or more cameras and use the migration and duplication functions. Use this procedure to activate an additional license.

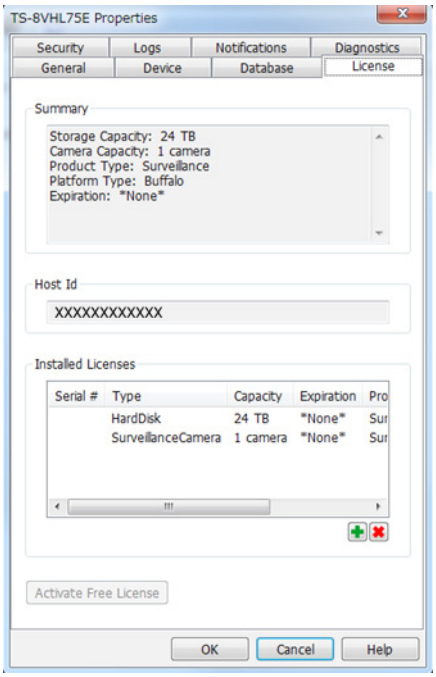
When the TeraStation is Connected to the Internet

1 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Vault Admin*.

2 Select the TeraStation to which you want to add the license, right-click it, and click *Properties*.

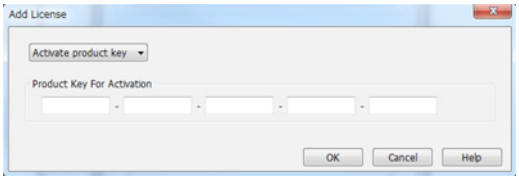


3 Open the *License* tab, then click +.

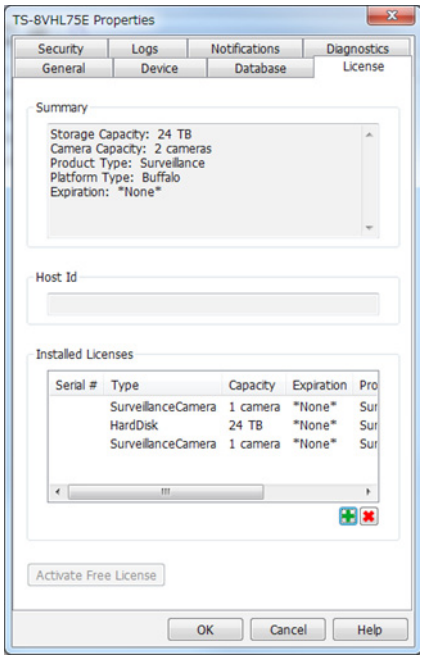


If your default free license activation is not installed, see "Enabling the Free License" to install it.

4 Enter the product key for the license pack (sold separately), then click *OK*.



5 Confirm that the new license was added to "Installed License".



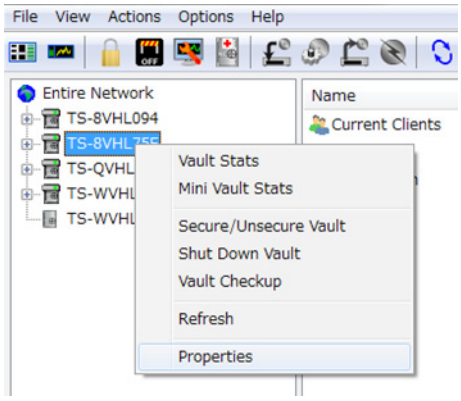
You have now activated the additional license.

TeraStation Not Connected to the Internet

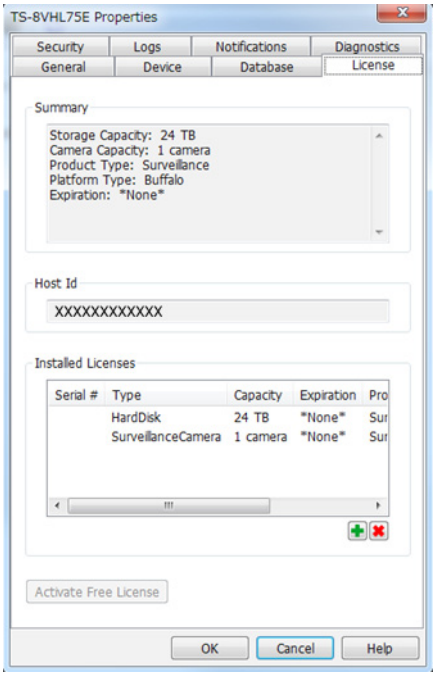
1 If the TeraStation is being used in an environment where Internet access is not available, a separate computer with access to the Internet is required to activate the additional license.

2 Click *Start* - *BUFFALO* - *BUFFALO Surveillance Server* - *Vault Admin*.

3 Select the TeraStation where you want to add the license, right-click it, and click *Properties*.

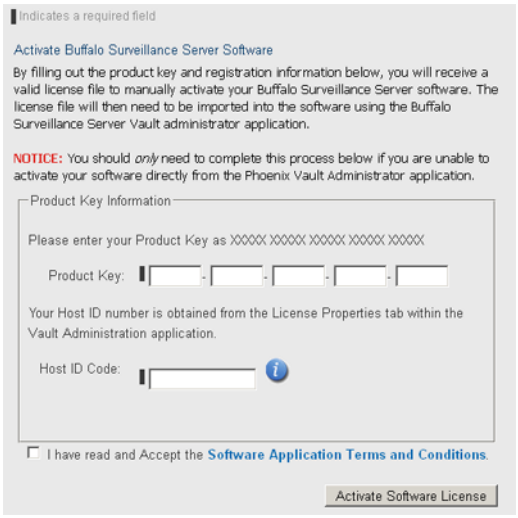


4 Open the *License* tab, then make a note of the "Host Id".



5 Open the website below in web browser.
http://buffalo.jp/support_s/camera_licence/

6 From the license pack (sold separately), enter the product key and host ID code and click "Activate Software License".

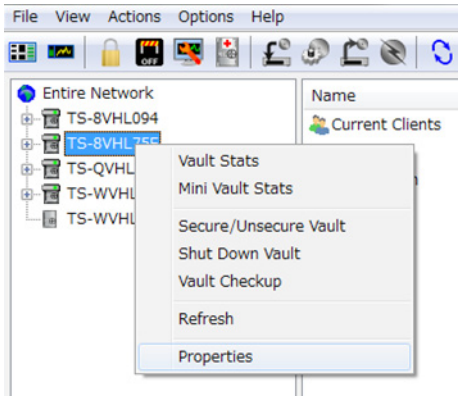

Indicates a required field
Activate Buffalo Surveillance Server Software
By filling out the product key and registration information below, you will receive a valid license file to manually activate your Buffalo Surveillance Server software. The license file will then need to be imported into the software using the Buffalo Surveillance Server Vault administrator application.
NOTICE: You should only need to complete this process below if you are unable to activate your software directly from the Phoenix Vault Administrator application.
Product Key Information
Please enter your Product Key as XXXXX XXXXX XXXXX XXXXX XXXXX
Product Key:
Your Host ID number is obtained from the License Properties tab within the Vault Administration application.
Host ID Code:
I have read and Accept the Software Application Terms and Conditions.
Activate Software License

7 Downloading of the license file (*.lic) begins. Save the license file to a USB memory device or other storage device.

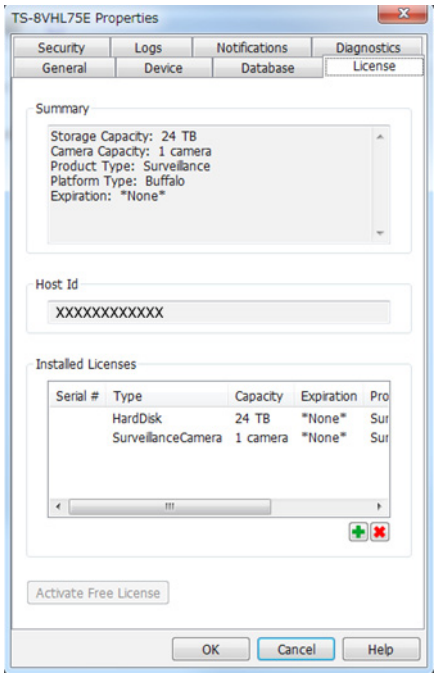
8 Copy the license file to a computer connected to the same network as the TeraStation.

9 In the computer connected to the same network as the TeraStation, click *Start - BUFFALO - BUFFALO Surveillance Server - Vault Admin*.

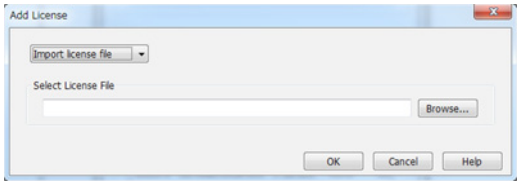
10 Select the TeraStation to which you want to add the license, right-click, and click *Properties*.



11 Open the *license* tab, then click +.

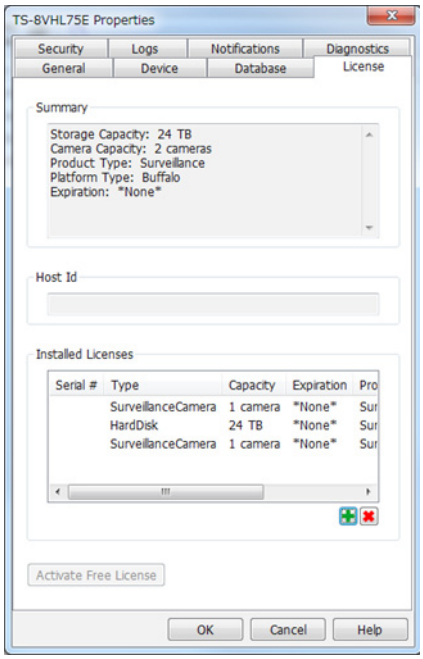


12 Select *Import license file*, then click *Browse*.



13 Select the license file that was saved before, then click *OK*.

14 Check that the license pack was added to "Installed Licenses".



This completes authentication of an additional license.

Troubleshooting

Issue	Possible Cause	Possible Solution
Video recording does not start.	Surveillance Camera setting not enabled.	Enable the Surveillance Camera from Settings.
	A LAN cable between the TeraStation and network camera is disconnected, or the power is turned off.	Check that the LAN cables are inserted correctly.
	The video recording policy is not registered.	Register the video recording policy from Camera Policies.
	The device is not connected to a network on the same LAN, or the device is not connected to the LAN port that was set in Settings.	Connect the device to the network of the LAN port that was set in Settings.
	The disk is full.	Free available space on the disk by moving or deleting files.
	The time for the TeraStation and network camera is not correct.	Set the time in Settings.
	There are not enough camera licenses for the network cameras.	Purchase and register an additional license.
I cannot enable the surveillance camera.	Failover is running.	Disable failover.
Surveillance cameras no longer record video.	The target shared folder for the recorded video was deleted.	Enable surveillance camera functionality in Settings.
I cannot view the network camera using Live Viewer.	The network camera is not registered in some camera policies.	Register the network camera from camera policies.
	There is an error in the network camera settings.	Verify the settings in the camera policies.

Issue	Possible Cause	Possible Solution
There is no recorded data, or the recorded data cannot be found.	A camera was added in camera policies while Surveillance Video Manager was running.	If this is the case, this video may not be accessible. Restart Surveillance Video Manager to enable searching for recorded video from the new camera.

Notes:

- QuickTime is a trademark of Apple Inc., registered in the U.S. and other countries.
- VLC media player is a trademark of Video LAN org.
- See www.buffalotech.com for supported cameras.
- Refer to the "Buffalo Surveillance Server Administrator's Guide" for information about client tools.

Chapter 10 Advanced Features

Email Notification

Your TeraStation can send you email reports daily, or when settings are changed or an error occurs. Notification emails may be triggered by any of the following events:

- Backup job completed
- Change to RAID configuration
- RAID error
- Fan error
- Hard drive read error
- Hard drive replacement
- Quota exceeded

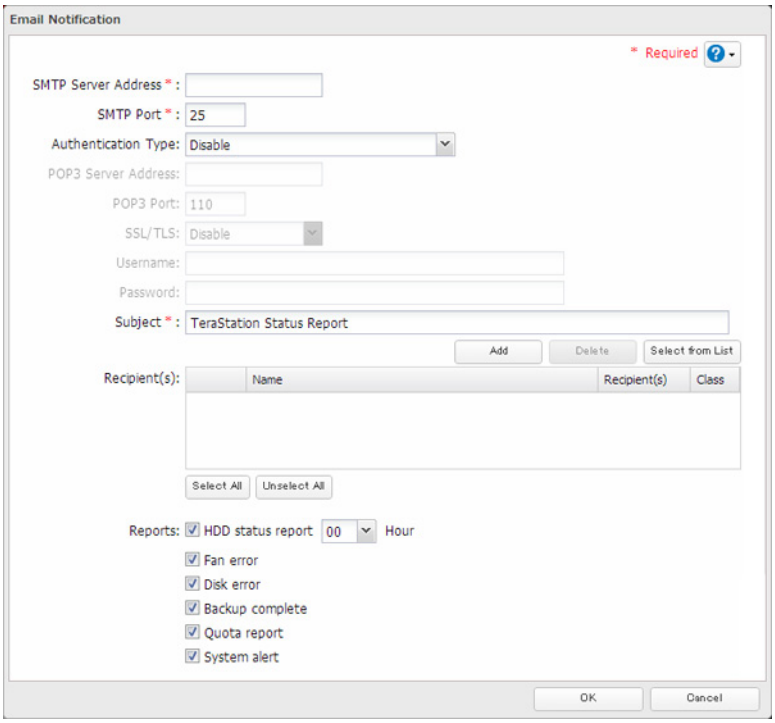
1 In Settings, click *Management*.

2 Move the email notification switch to the position to enable email notification.

3 Click to the right of "Email Notification".

4 Click *Edit*.

5 Enter your mail server settings and choose what events will trigger notification. Click *OK* to send a test email.



Sleep Mode

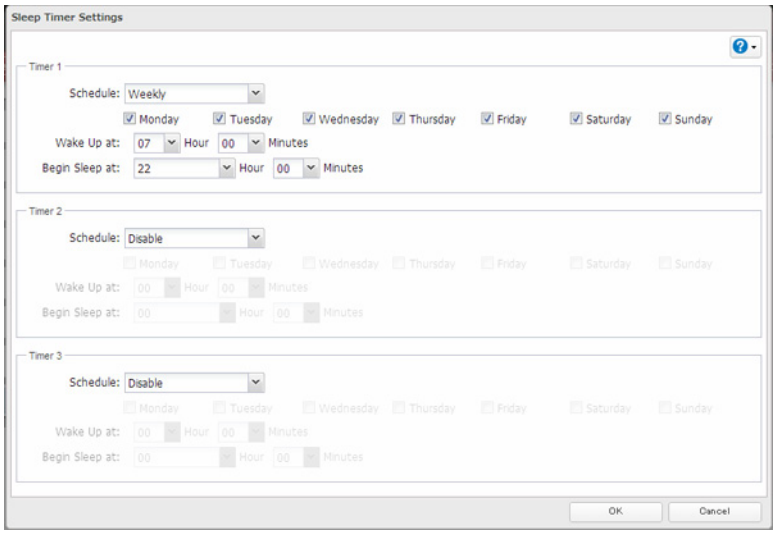
To save energy, you can specify times to put the TeraStation into sleep (standby) mode, where the hard drive and LEDs are turned off.

1 In Settings, click *Management*.

2 Click the icon to the right of "Sleep Timer".

3 Click *Edit*.

4 Specify the timer interval, wake-up time, and time go into sleep mode, then click *OK*.



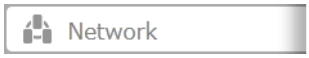
Notes:

- Up to three timers can be set.
- The time to enter sleep mode can be set from 0:00 to 3:45 of the next day.
  The time to wake from sleep mode can be set from 0:00 to 23:45.
  If the time to enter sleep mode is after 24:00, the wake-up time setting may be from 4:00 to 23:45.
- The time to enter sleep mode should not be set at the same time as or before the start time.
- If a backup task is scheduled during a disk check, disk format, backup job, or within 5 minutes of the current time, the TeraStation will not change to standby mode when the configured time is reached.
- If scheduled times in the timer overlap, operation is performed using the widest time interval.
- Examples of multiple timer settings are shown below.
  Example 1: If running at a current time of 10:00 Wednesday
  Timer 1: Daily 12:00–24:00
  Timer 2: Not used
  Timer 3: Not used
  No operation is performed at 12:00, and operation changes to standby mode at 24:00.
  Example 2: When running at a current time of 10:00 Wednesday
  Timer 1: Daily 9:00–18:00
  Timer 2: Wednesday 10:00–20:00
  Timer 3: Not used
  On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00. On Wednesday, the unit goes into sleep mode at 20:00.
  Example 3: If running at the current time of 10:00 Wednesday
  Timer 1: Daily 9:00–18:00
  Timer 2: Wednesday 10:00–1 am of the next day
  Timer 3: Not used
  On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00. On Wednesday, normal operation begins at 9:00, and the unit goes into sleep mode at 1:00 am the next day.
  Example 4: If running at a current time of 10:00 Wednesday
  Timer 1: Daily 9:00–18:00
  Timer 2: Wednesday 7:30–22:00
  Timer 3: Not used
  On days other than Wednesday, normal operation begins at 9:00 and the unit goes into sleep mode at 18:00. On Wednesday, normal operation begins at 7:30 and the unit goes into sleep mode at 22:00.
- To wake the TeraStation from sleep mode manually, press the power button.

Wake-on-LAN

The TeraStation supports Wake-on-LAN, which allows it to be turned on remotely.

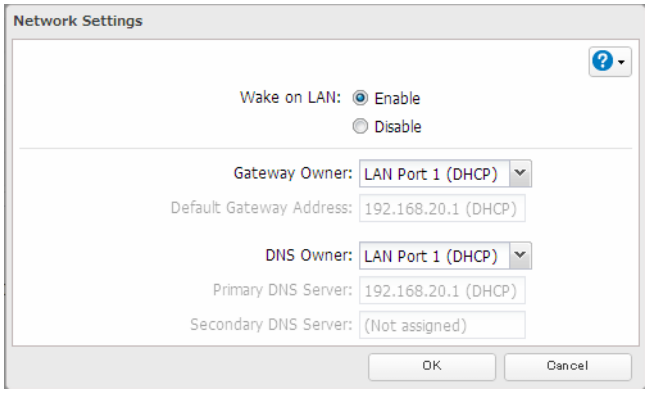
1 In Settings, click *Network*.



2 Click the icon to the right of "IP Address".

3 Click *Change*.

4 Enable "Wake-on-LAN", then click *OK*.



Wake-on-LAN is now enabled. As long as it is connected to power and the network, you can turn on the TeraStation remotely.

Notes:

- After a power outage, wait 5 minutes after power is restored to send the Wake-on-LAN packet to the TeraStation.
- After receiving the Wake-on-LAN packet, the TeraStation may take approximately five minutes to be ready to use.
- To use Wake-on-LAN, you'll need Wake-on-LAN software such as AMD's Magic Packet utility. The TeraStation does not include Wake-on-LAN software.
- The TeraStation does not support using Wake-on-LAN and port trunking at the same time. You may use either feature, but not both at the same time.
- On the local network, Wake-on-LAN packets may be sent to port 2304 on either of the TeraStation's LAN ports. If the TeraStation is connected to a Buffalo wireless router configured for remote access, then it may be turned on from outside the local network (from the WAN side). To use this feature, connect the router to only LAN port 1 on the TeraStation.

UPS (Uninterruptible Power Supply)

If a UPS (sold separately) is attached, the TeraStation can be automatically shut down for protecting data in the event of a power outage.

1 Plug the power cable of the UPS to a wall socket.

2 Connect the AC cable of the TeraStation to the UPS.

3 Connect the UPS and TeraStation using a USB cable or serial cable.

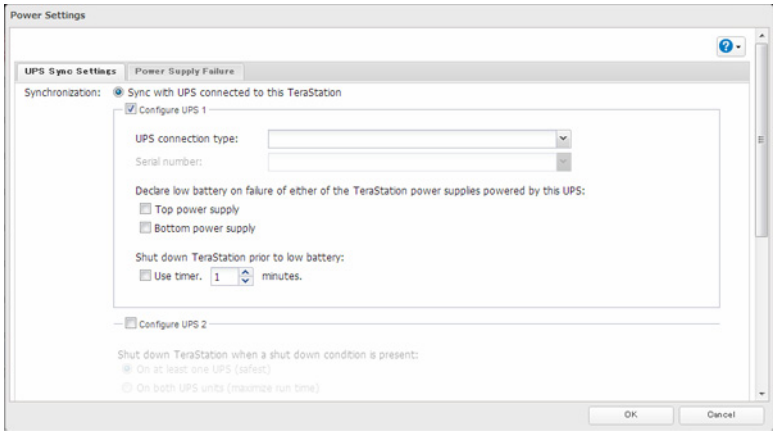
4 Turn on the UPS, then the TeraStation.

5 In Settings, click *Management*.

6 Click to the right of "Power".

7 Click *Edit*.

8 Configure the desired settings, then *OK*.



9 Reboot your TeraStation. Settings are applied after the TeraStation restarts.

Notes:

- If the TeraStation is connected directly to a UPS, select "Sync with the UPS connected to this TeraStation". If a different TeraStation is connected to the UPS, select "Sync with the UPS connected to another TeraStation on the same network." After making this selection, enter the IP address of the TeraStation that will be the sync source in "Other TeraStation's IP Address".
- If you have only one UPS, then configure "UPS 1". Don't select "Configure UPS 2" unless you have already configured UPS 1 and have a second UPS to configure.
- When the TeraStation is rebooted after an automatic shutdown (such as from a power outage or power supply problem), verify that the power supply has been restored. If the TeraStation is turned on while it is still running on the UPS and without the power supply restored, automatic shutdown is not performed, even after the specified time has elapsed.
- If the power supply from the UPS to the TeraStation is stopped and restarted when UPS recovery is enabled, the TeraStation is automatically restarted.

Connecting a Printer

You can connect a printer to the USB port on the TeraStation.

Notes:

- Only one USB printer can be connected to the TeraStation.

- Bidirectional communication is not supported i.e., remaining ink quantities and other printer status information is not supported.
- If a multifunctional printer is connected, only the printer function can be used. Other functions such as scanning will not be available.
- The print server does not support Mac OS.

Setting Up a Printer with Windows 7 or Windows Vista

1 In Settings, click *Services*.

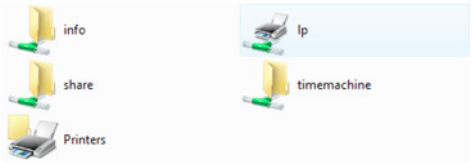
2 Move the print server switch to the position to enable the print server.

3 Refer to the manual supplied with the printer and install the printer drivers.

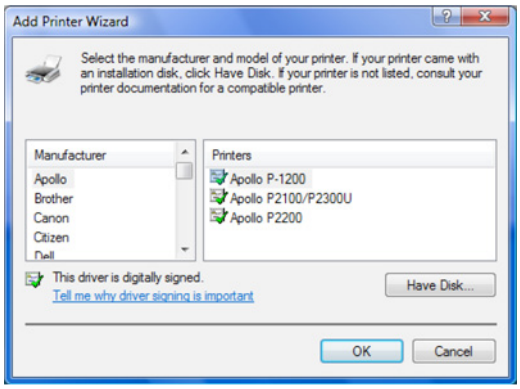
4 Click *Start* - *Network*.

5 Double-click the TeraStation server name.

6 Double-click the icon of the connected printer (shared name is displayed).



7 Select your printer, then click *OK*.



8 Register the printer.

Setting Up a Printer with Windows XP

1 In Settings, click *Services*.

2 Move the print server switch to the position to enable the print server.

3 Refer to the manual supplied with the printer.

4 Click *Start* - *Control Panel*.

5 Click *Network and Internet Connections*.

6 Click *My Network Places* - *View workgroup computers* - *(Name of the TeraStation Server)*.

7 Double-click your printer icon.

8 When "The server for the printer does not have the correct printer driver installed. If you want to search for the proper driver, click *OK*." displays, click *OK*.

9 Register the printer.

You have added a printer.

Auto RAID Rebuild

If auto RAID rebuild is enabled, RAID arrays will rebuild automatically after a failed drive is replaced. You may enable or disable auto RAID rebuild in *Drives*.

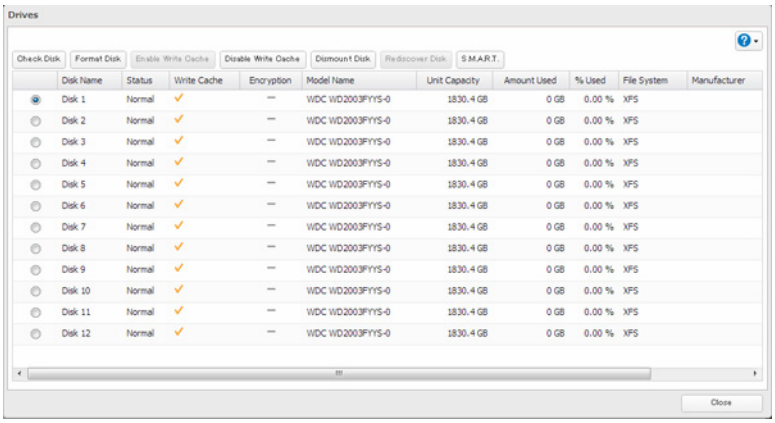
1 In Settings, click *Drives*.

2 Move the auto RAID rebuild switch to the position to enable automatic rebuilding.

Note: You may see an "I32" message in NAS Navigator2 when you insert a blank replacement drive. This will disappear when the RAID rebuild begins.

Write Caching

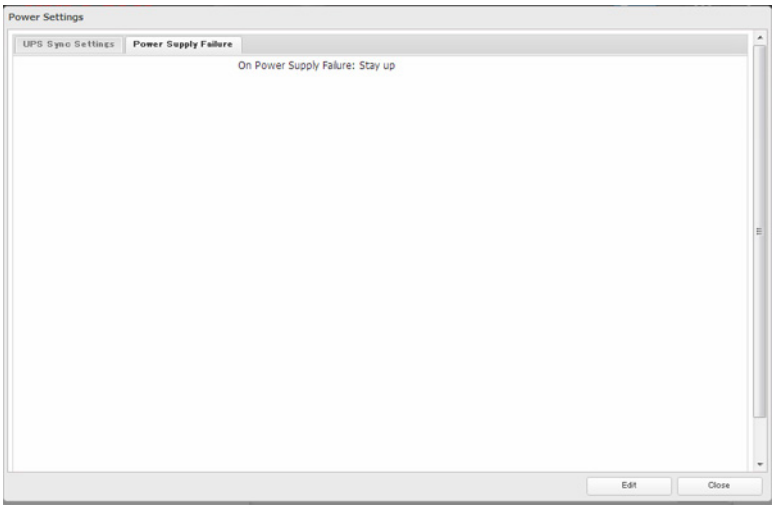
Caching can speed up disk writes, but increases the danger of data corruption if power is suddenly disconnected. You may enable or disable write caching in *Drives* - *Drives*.



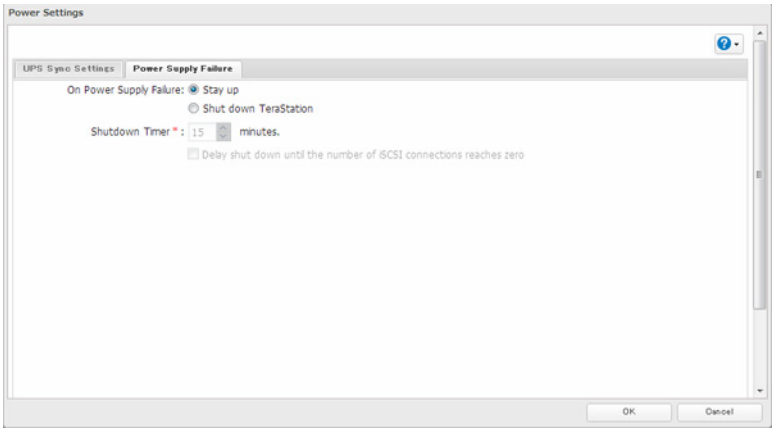
Power Supply Failure

You may configure the TeraStation to shut down automatically if a power supply fails in *Management - Power*.

1 Navigate to *Management - Power* in Settings. Choose the *Power Supply Failure* tab.



2 Click *Edit*.

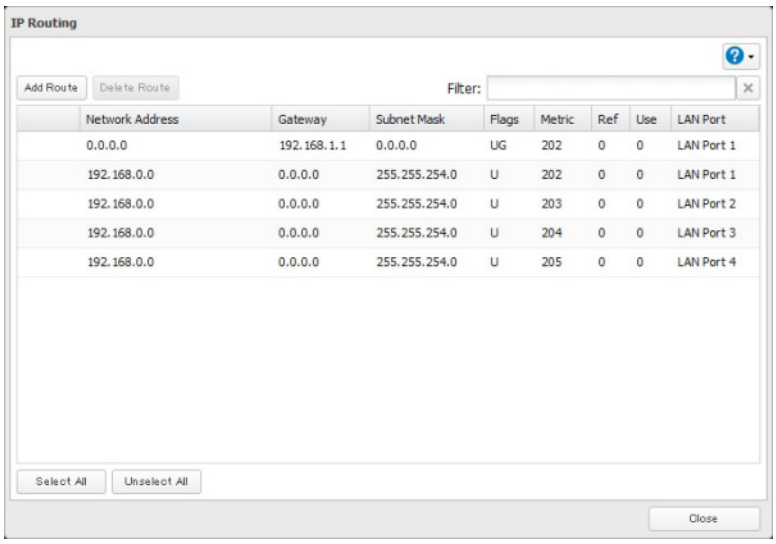


3 Select the number of minutes after the power supply fails to have the unit shut down. Click *OK*.

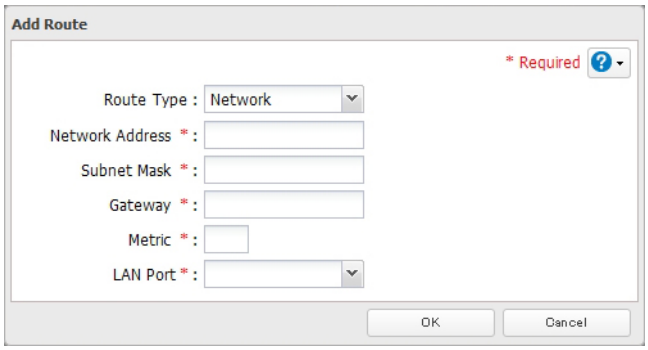
IP Routing

IP routing allows viewing and editing the routing table. You may configure it in *Network - IP Routing*.

1 Navigate to *Network - IP Routing* in Settings. The routing table will open.



2 Click *Add Route*.

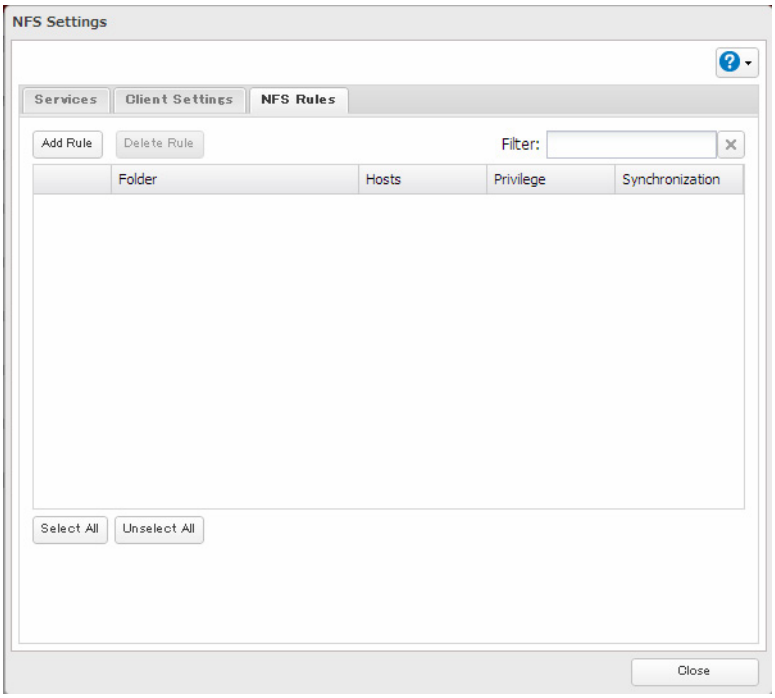


3 Choose your route type, enter the necessary information, and click *OK*.

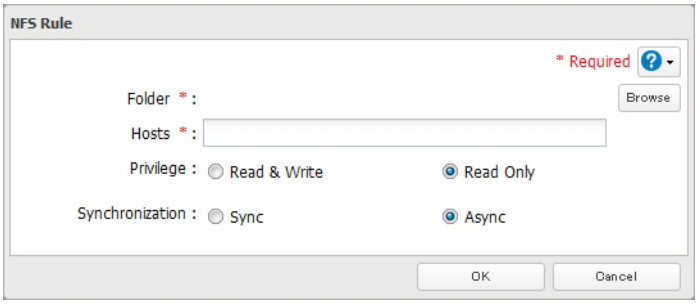
NFS Rules

NFS rules let you restrict who can access your NFS share. By default, no one can access NFS shares until rules are created to allow them access. Only users detailed by rules will be able to access the share. To add an NFS rule, follow the steps below.

1 Navigate to *File Sharing - NFS* in Settings. Select the *NFS Rules* tab and click *Add Rule*.



2 Browse to the folder whose settings you want to change.



3 In the *Hosts* field, enter the hostnames or IP addresses (comma separated) of the devices that will be able to access the folder. Or, put an asterisk in the field to allow access for everyone. Click *OK*.

TeraSearch

TeraSearch lets you search for character strings contained in files (text files, Word files, etc.) stored on the TeraStation. Follow the steps below to enable it.

1 Open *Folder Setup*.

2 Click the shared folder to be indexed.

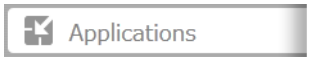
3 Click *Edit*.

4 Check "Include this folder in the search index", then click *OK*.

5 Click *OK*.

6 Click *Close*.

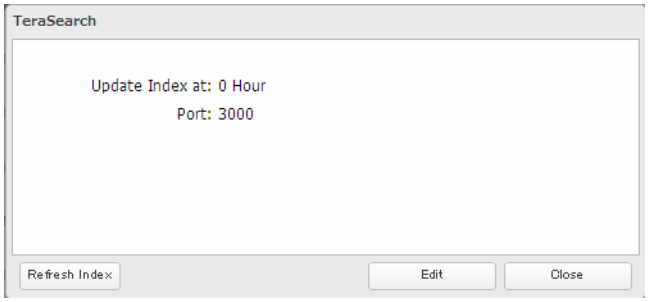
7 Click *Applications*.



8 Move the TeraSearch switch to the position to enable TeraSearch.

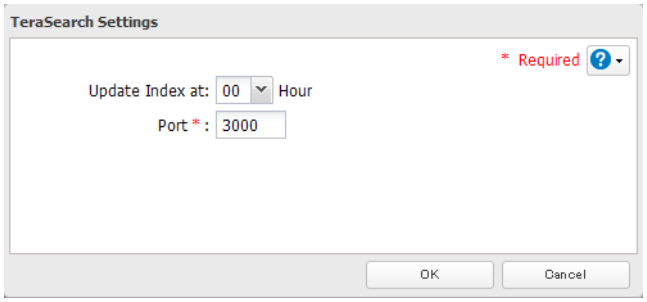
9 Click to the right of "TeraSearch".

10 Click *Refresh Index*.



11 Click *Edit*.

12 Enter the port number that you want to use and the time that the index will be updated, then click *OK*.



13 Open the following URL in your browser.
http://(IP address of your TeraStation):3000/

Note: You can identify your IP address from NAS Navigator2.

14 Enter your TeraStation's username and password, then click *Login*.

15 Enter a keyword in the "Search Text" field. Click *Advanced Search* to enable searches by specifying the filename, owner, date updated, and file size.

16 Click *Search*.
The search results are displayed. Click the filename in the results to open the file.

Offline Files

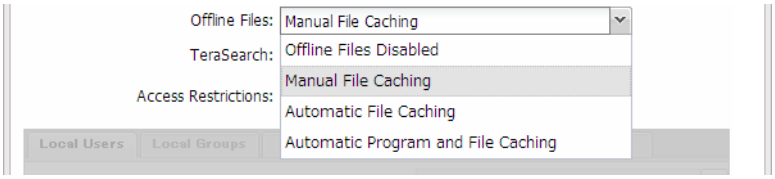
Offline files (included with many versions of Windows, can be used to access files in the TeraStation, mimicking the computer's behavior even if it is disconnected from the network. When connected to the network again, the updated files are written and synchronized. Follow the procedure below to use offline files.

1 In Settings, click to the right of "Folder Setup".

2 Click the shared folder for offline files.

3 Click *Edit*.

4 Choose "Manual File Caching", "Automatic File Caching", or "Automatic Program and File Caching", then click *OK*.



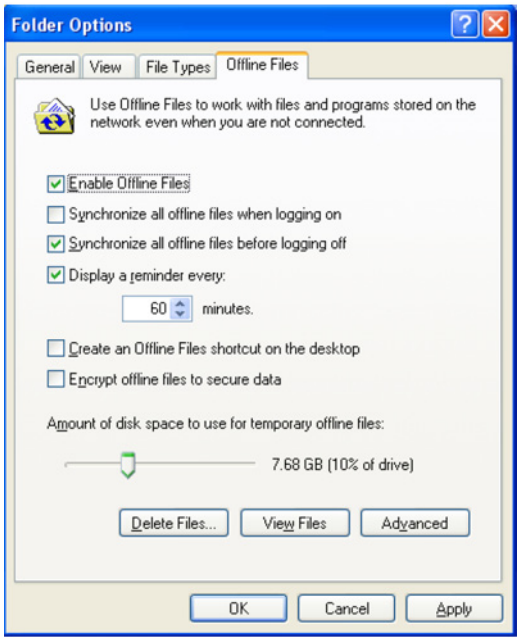
- **Manual File Caching** - Files used offline must be selected by the user.
- **Automatic File Caching** - Opened files can be cached locally for offline use. Previous versions of files that are not synchronized are automatically replaced by the latest versions.
- **Automatic Program and File Caching** - Opened files can be cached locally for usage offline. Previous versions of files and applications executed from the network that are not synchronized are automatically deleted, and they are replaced by the latest version of the files and applications.

5 Click *OK*.

6 Click *Close*.

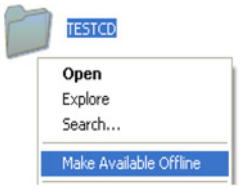
7 In Windows, navigate to *Folder options*. (Windows 8.1, Windows 8, and Windows 7 users should skip to step 9).

8 Check "Enable Offline Files", then click *OK*.


Folder Options
General
View
File Types
Offline Files
Use Offline Files to work with files and programs stored on the network even when you are not connected.
Enable Offline Files
Synchronize all offline files when logging on
Synchronize all offline files before logging off
Display a reminder every:
60
minutes.
Create an Offline Files shortcut on the desktop
Encrypt offline files to secure data
Amount of disk space to use for temporary offline files:
7.68 GB (10% of drive)
Delete Files...
View Files
Advanced
OK
Cancel
Apply

Note: Offline files cannot be enabled if "Use Fast User Switching" is enabled. To change the setting, open "User Accounts" in Control Panel and select "Change the way users log on or off".

9 Right-click the icon of the shared folder on the TeraStation for which you have set the offline feature, then click *Make Available Offline*.

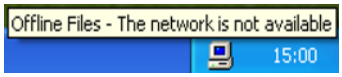


10 When the offline file wizard opens, follow the instructions on the screen. For more information, refer to the Windows help.

11 When the offline settings and sync settings are completed using the wizard, the files and folders set appear as shown:

12 If the network is disconnected after synchronization is completed, the offline file function can be used. Offline files can be accessed by the original Universal Naming Convention (UNC) where the data was saved.

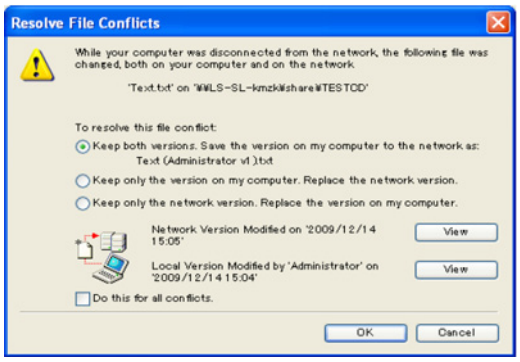
Note: If offline files can be used, an icon appears in the system tray.



Editing Offline Files - Offline files can be edited and deleted in the same way as normal files. Differences that arise from the original data on the network due to editing or deleting of the file are resolved by resynchronization after the network is reconnected.

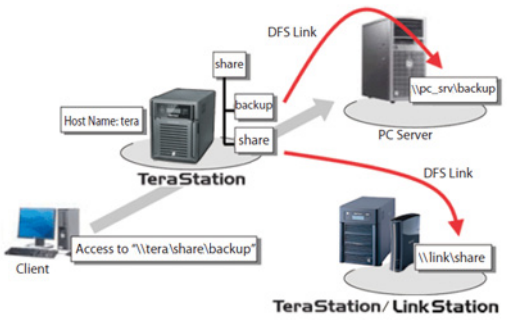
Synchronizing Offline Files - The offline file is automatically synchronized based on preset conditions, such as after reconnection with the network, logging on, logging off, etc.

Version Conflicts - A file conflict occurs if different changes were made simultaneously to the offline file and original data on the network. The screen below is displayed when a file conflict is detected. Resolve the conflict by following the instructions on the screen.


Resolve File Conflicts
While your computer was disconnected from the network, the following file was changed, both on your computer and on the network.
'Text.txt' on '¥¥LS-SL-kmzk¥share¥TESTCD'
To resolve this file conflict:
Keep both versions. Save the version on my computer to the network as:
Text (Administrator v1).txt
Keep only the version on my computer. Replace the network version.
Keep only the network version. Replace the version on my computer.
Network Version Modified on '2009/12/14 15:05'
View
Local Version Modified by 'Administrator' on '2009/12/14 15:04'
View
Do this for all conflicts.
OK
Cancel

DFS

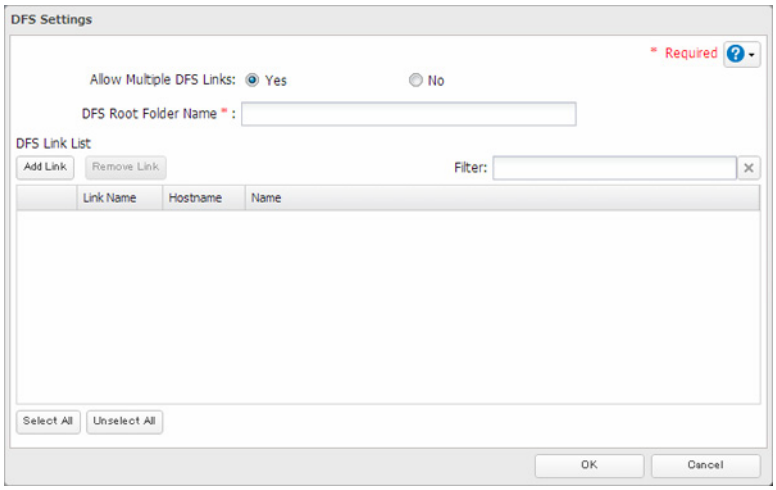
DFS (Distributed File System) is a set of client and server services that allows Windows users to organize many distributed SMB file shares into a distributed file system. Follow the steps below to enable DFS on the TeraStation.



1 In Settings, click the icon to the right of "DFS".

2 Click *Edit*.

3 Enable or disable "Allow Multiple DFS Links".



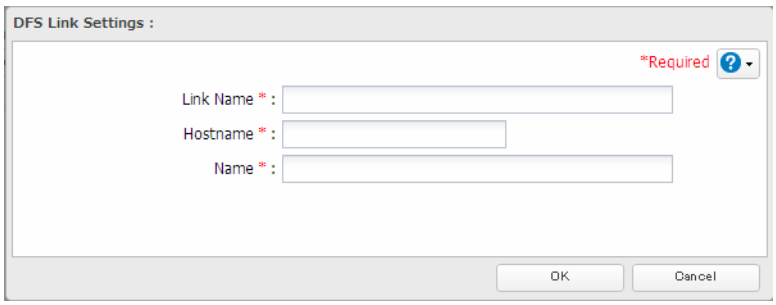
Note: If enabled, a DFS link target shared folder is created under the DFS root. If disabled, up to eight DFS link target shared folders can be created under the DFS root.

4 Enter *DFS Root Folder Name*.

5 Click *Add Link*.

6 Click *Yes*.

7 Enter the link name, hostname, and shared folder name, then click *OK*.



Notes:

- TeraStations, LinkStations, and SMB-compatible Windows computers can be specified as DFS link targets (Mac OS and Linux are not supported).
- If "Allow Multiple DFS Links" is disabled, then you may create up to 8 hostnames and DFS links.

8 Click *OK*.

9 Move the DFS switch to the position to enable DFS.

Accessing from a NFS Client

Note: (US purchasers only) Buffalo's customer support will help configure the NFS settings on your TeraStation, and will support VMware, Citrix, and Windows clients but will not provide support for configuring your Linux or other UNIX clients. There are many types of UNIX and the procedures for configuring NFS with them will vary considerably.

For help configuring your NetWare, Linux, or other UNIX clients for NFS support, please consult each client's own documentation and support.

1 Open *Folder Setup*.

2 Choose the shared folder that will be accessible to the NFS client.

3 Click *Edit*.

4 Under "LAN Protocol Support", enable "NFS". Click *OK*.
Note the NFS path. It will be used later for accessing data from an NFS client.

5 Click *Close*.

6 Move the NFS switch to the position to enable NFS.

7 Click the icon to the right of "NFS".

8 Click *Client Settings*.

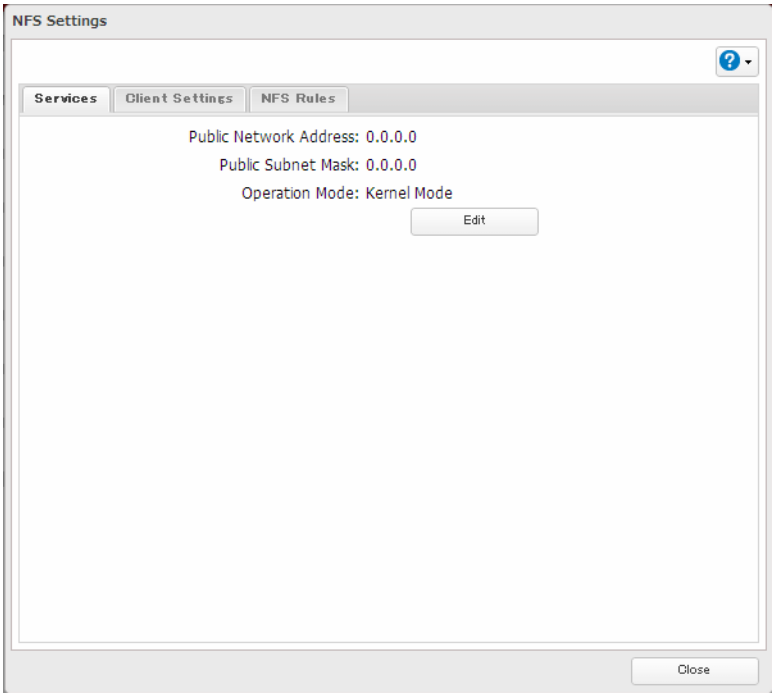
9 Click *Add Client*.

10 Enter the IP address and hostname of the NFS client, then click *OK*.
To delete the client, check the hostname and click *Delete Client*.

11 Click *Close*.

12 Enter the mount command to access the shared folder from the NFS client.
The mount command depend on your operating system. The examples below assume that IP address of your TeraStation is 192.168.11.10, "/mnt/array1/share" is the desired NFS path, and "/mnt/nas" or drive letter "z" is the mount point.
For Linux:
mount -t nfs 192.168.11.10:/mnt/array1/share /mnt/nas
For Windows Service for Unix 3.5:
mount 192.168.11.10:/mnt/array1/share z:
For Solaris 10:
mount -F nfs 192.168.11.10:/mnt/array1/share /mnt/nas

Notes:



- To restrict NFS access to a specific network or client, navigate to *File Sharing - NFS - Services* and click *Edit*. Enter the address of the network. For example, if your local network subnet has a router at 192.168.1.1 and clients with IP addresses in the range from 192.168.1.2 through 192.168.1.48 with subnet mask 255.255.255.0, then the "Public Network Address" would be 192.168.1.0 and the "Public Subnet Mask" would be 255.255.255.0. This would mean that only clients on this local network would be able to access the NFS share. If the default settings are used (0.0.0.0 for both the public network address and the public subnet mask), then access to the NFS share will not be restricted.
- To use NFS folders with VMware ESX/ESXi or Citrix, navigate to *Services - Edit* and change the operation mode from "User Mode" to "Kernel Mode".
- Async is the default for NFS rules. Sync is available only when the device is in kernel mode.
- To restrict access to a NFS share for specific clients, navigate to *File Sharing - NFS - NFS Rules* and click *Add Rule*. Choose the folder to restrict access to, and enter the clients that will have restricted access in the "Hosts" field. Clients may be entered by hostname, IP address, or IP address range. Wildcards are supported. Separate multiple entries with commas. You may assign read-only or read & write access to the listed clients. Rules override settings made from the *Services* tab.

Encrypting Data Transmission

Encrypting Settings Data

All communication to Settings can use SSL encryption if you access settings through https://.

Encrypting FTP Transfer Data

You can encrypt passwords and files using SSL/TLS for secure FTP communication. First, in the shared folders settings, select *FTP* under *LAN Protocol Support* In Settings. Enable SSL security in the setup screen for your FTP client. The procedure depends on the FTP client software.

SSL Keys

SSL keys are used during setup screen operations and FTP communication. SSL (Secure Socket Layer) is a type of encryption system called public key encryption. Generally, SSL is managed by the two files below.

server.crt (SSL Certificates)

In this system, the TeraStation sends this file to the computer, and the computer uses this key to perform encryption. The TeraStation receives the encrypted data and uses server.key (private key) to decrypt the data.

In SSL, this key contains the server certificate, and depending on your computer environment, a check may be performed to determine the trustworthiness of the certificate. The server certificate included in the TeraStation in the default settings was created by Buffalo Technology, and in some cases the message "There is a problem with this website's security certificate" may be displayed in your browser or other software. Disregard this message and continue.

server.key (SSL Key)

This file is used as a pair with server.crt (server certificate). This is required for decrypting the data that was encrypted by the server certificate, and this is normally not revealed.

Updating SSL Key

To update a server certificate and a private key for SSL, follow this procedure.

1 Click *Management* - the icon to the right of "SSL".

2 Register "server.key" for "Secret Key" and "server.crt" for "Server Certificate (.crt)", then click *Import*.

Notes:

- Place the SSL key files (server.key, server.crt) directly below the C root drive. The SSL key may not be able to be updated if it is placed in folders or paths that contain multi-byte characters.
- Use the provided password for the SSL key.
- If Settings cannot be displayed after updating, initialize the TeraStation settings.
- Updating the firmware initializes an SSL key.

Web Server

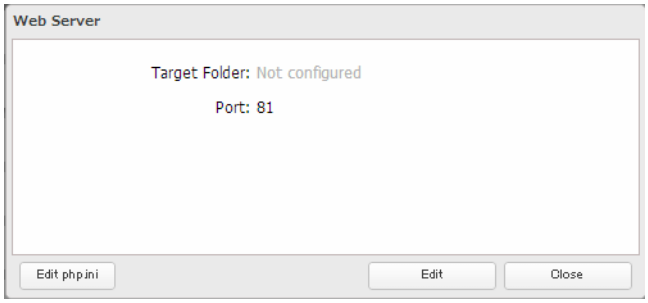
The TeraStation can be used as a web server. In addition to HTML files, images, and JavaScript, the TeraStation also allows installation of Perl script and PHP script files. The web server uses version 1.4.23 of lighttpd, version 5.8.8 of Perl, and version 5.2.10 of PHP.

1 In Settings, click *Services*.

2 Move the web server switch to the position to enable the web server.

3 Click to the right of "Web Server".

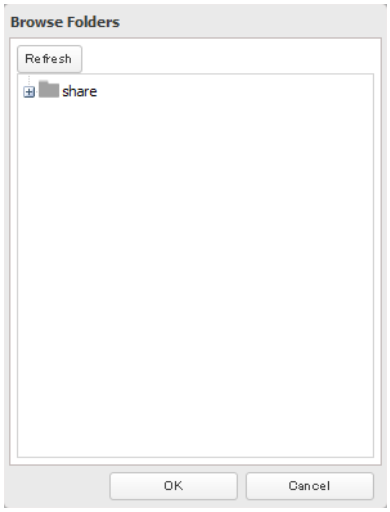
4 Click *Edit*.



Note: The settings of the PHP language interpreter can be changed from "Edit php.ini".

5 Click *Browse*.

6 Choose a shared folder for the web server, then click *OK*.



7 Choose an external port, then click *OK*.

MySQL Server

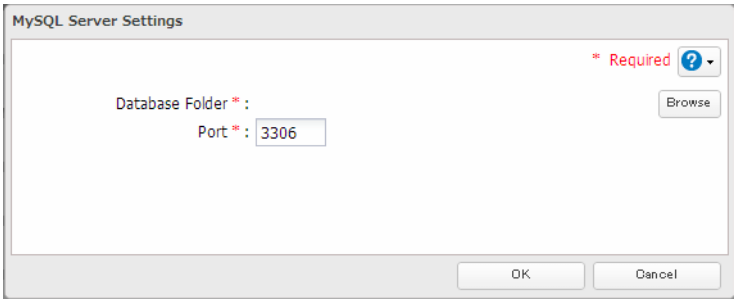
The TeraStation can be used as a MySQL server. A MySQL database may be installed and linked with the web server. The TeraStation uses version 5.0.70 of MySQL server and version 3.2.2 of PhpMyAdmin.

1 In Settings, click *Services*.

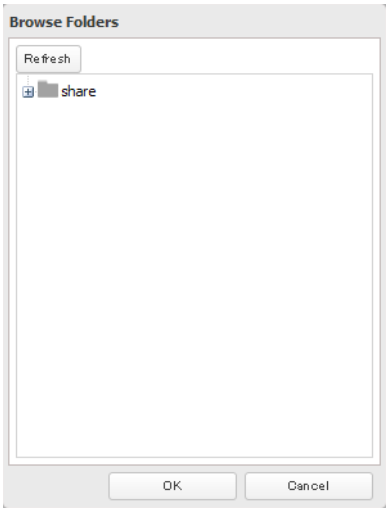
2 Click the icon to the right of "MySQL Server".

3 Click *Edit*.

4 Click *Browse*.



5 Choose a shared folder for the MySQL server, then click *OK*.



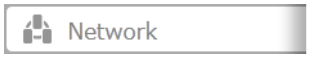
6 Choose an external port, then click *OK*.

7 Move the MySQL server switch to the position.

SNMP

If SNMP is enabled, you can browse your TeraStation from SNMP-compatible network management software. The specific MIB (management information base) file for Buffalo is available from the Buffalo website (buffalotech.com).

1 In Settings, click *Network*.



2 Move the SNMP switch to the position to enable SNMP.

3 Click to the right of "SNMP".

4 Click *Edit*.

5 Configure the desired settings, then click *OK*.

Saving and Applying Settings

The TeraStation's settings can be saved to a USB memory device and restored to another TeraStation. Use this function to back up and copy settings to a new TeraStation.

Make a note of the hard drive configuration (number of hard drives, RAID, LVM, etc.) of the TeraStation where the settings were saved. Make sure that any TeraStation that you apply these settings to has exactly the same hard drive configuration before you apply the settings. If the drive configuration is different, you may get unexpected results.

The following settings are not saved or restored:

Category	Settings
Folder Setup	Shared folders on USB drives and media cartridges
	DLNA protocol
	Offline file settings
	Email addresses linked to user accounts
	Email addresses for group notification
Drives	All settings in "Drives"
	All settings in "LVM"
	All settings in "iSCSI"
Backup	All settings in "Failover"
Management	All settings in "Power"
	All settings in "SSL"
	Display language in Settings

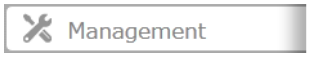
Saving Settings

1 Insert a USB memory device into a USB port on the TeraStation.

Notes:

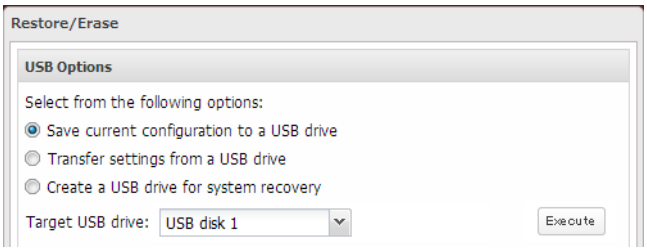
- Use a USB 2.0 port. If your TeraStation has both USB 3.0 and USB 2.0 ports, make sure that you use one of the USB 2.0 ports.
- The USB memory device should have a capacity of at least 1 GB.
- Any data stored on the USB memory device will be deleted.

2 In Settings, click *Management*.



3 Click to the right of "Restore/Erase".

4 From "Target USB drive", select the USB memory device that is connected to the USB 2.0 port of the TeraStation.



5 Select "Save current configuration to a USB drive", then click *Execute*.

Troubleshooting:

If the settings are not saved to the USB memory device successfully, you may receive the error message "The specified operation cannot be executed". Verify:

- The device is connected to a USB 2.0 port, not a USB 3.0 port.
- The device has a capacity of 1 GB or larger.
- The device is not write-protected.

Applying Settings

The saved settings can be applied to a different TeraStation.

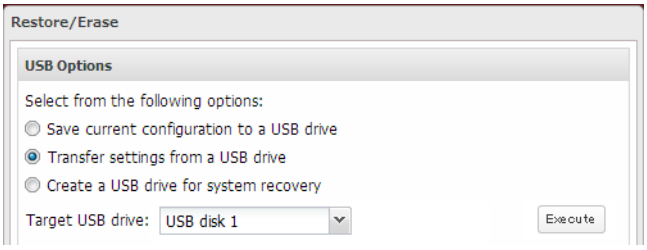
Note: By applying settings from the USB memory device, the hostname and IP address will conflict because these settings are restored. Change the existing TeraStation's hostname and IP address to different settings before applying settings.

1 Connect the USB memory device with the saved settings to a USB 2.0 port of the TeraStation (not a USB 3.0 port).

2 In Settings, click *Management*.

3 Click the icon to the right of "Restore/Erase".

4 From "Target USB drive", select the USB memory device that is connected to the USB 2.0 port of the TeraStation.



5 Select "Transfer settings from a USB drive", then click *Execute*.

Recovering the TeraStation

Creating a Recovery Drive

A recovery drive can let you recover your TeraStation even if it will not boot at all. It lets you completely reinstall the operating system. While your TeraStation is working perfectly, create a recovery drive in case something goes wrong later. Follow the steps below to create a recovery drive for the TeraStation.

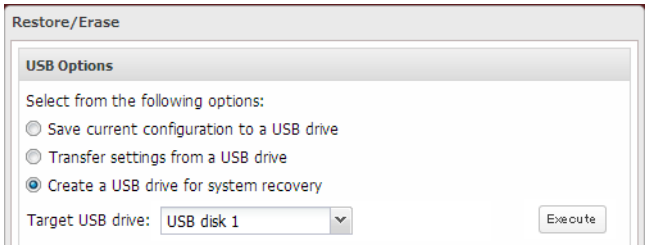
Note: Although making the recovery drive as described below will not effect your settings or data, if you ever have to use it to recover the TeraStation, all data and settings from the TeraStation will be erased. Back up your data and settings regularly!

1 Insert a 1 GB or larger USB flash drive into a USB port on the TeraStation.

Note: All data on the USB flash drive will be erased!

2 In Settings, navigate to *Management - Restore/Erase - USB Options*.

3 Select "Create a USB drive for system recovery".



4 Select the USB drive connected to the TeraStation from "Target USB drive", then click *Execute*. Enter the 4 digit confirmation number and click *OK*. The TeraStation will create the recovery drive. This will take about a minute.

5 When the "finished" dialog opens, the USB recovery drive is ready to use. Dismount the USB drive before unplugging it. See "Dismounting Drives" in chapter 4 for the instruction to dismount your USB drive.

Note: If your TeraStation will not boot, it's too late to create the recovery drive from within its software! Instead, download the recovery image from www.buffalotech.com and use disk image software such as dd or Win32 Disk Imager to image a 1 GB or larger USB flash drive with the downloaded file.

Recovering the TeraStation

If your TeraStation will not boot at all, you can completely reinstall the operating system.

Warning:

Recovering the TeraStation will erase all data and settings from the TeraStation. Back up your data and settings regularly!

To recover the TeraStation, follow the procedure below.

1 Insert the USB recovery drive into a USB port on the TeraStation.

2 Create a USB "recovery drive" as described above.

3 Connect a USB keyboard and a monitor to the TeraStation.

4 Power on the TeraStation and repeatedly hit the *F7* key over and over, twice per second, until the boot device menu appears.

5 Select the first "USB Flash Disk" from the menu. The name of this device will vary depending on the brand of your USB flash drive.
The TeraStation will begin the recovery process. It will take about 10 minutes to complete, during which time the TeraStation will reboot. When it finishes, the TeraStation will shut down completely and all the main LEDs will go out.

6 When the recovery process is complete and the TeraStation has shut down, remove the USB flash drive and power on the TeraStation. The TeraStation has been restored to its default settings. All data has been erased and all drives are combined into a RAID 0 array with no redundancy. For data security, creation of an array data with redundancy is recommended.

Logs

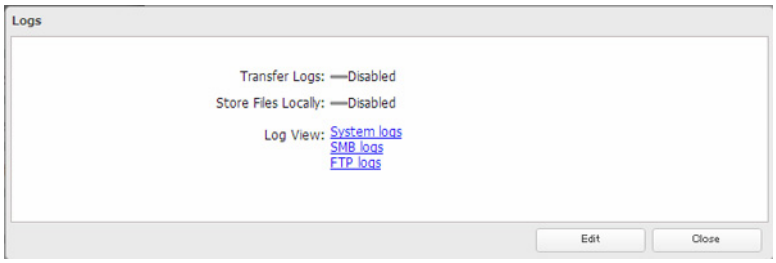
Follow this procedure to check the TeraStation's logs.

1 In Settings, click *Management*.

2 Click to the right of "Logs".

3 Click *Edit*.

4 Select a log to view.



The file operation log stores file operations performed on the internal hard drives. File operations on USB drives are not logged.

To transfer logs

1 Click *Edit*.

2 Enable "Syslog Transfer".

3 Enter the IP address of the syslog server where you want to transfer the logs to.

4 Select the type of log that you want to transfer from "Logs To Transfer".

5 Click *OK*.

Notes:

- You can also download logs from within Settings by using either of the following hotkeys: Alt+Ctrl+Shift+b or Alt+Ctrl+Shift+l.
- FTP logs cannot be written to a syslog server.
- Logs are in UTF-8 format. Your Syslog server must support UTF-8 encoding.

To create a link to the logs in the shared folder

1 Click *Edit*.

2 Enable "Share the link to logs".

3 Select the shared folder where the link will be created in "Target Shared Folder".

4 Click *OK*.

Under the selected shared folder, a folder named "system_log" will now contain the logs.

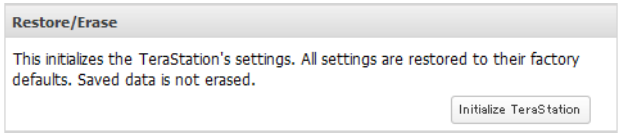
Restoring Factory Defaults

To initialize the TeraStation to its factory defaults, follow this procedure.

1 In Settings, click *Management*.

2 Click the icon to the right of "Restore/Erase".

3 Click *Initialize TeraStation*.


Restore/Erase
This initializes the TeraStation's settings. All settings are restored to their factory defaults. Saved data is not erased.
Initialize TeraStation

4 The "Confirm Operation" screen will open. Enter the displayed number, then click *OK*.

5 The TeraStation will be restored to its factory default settings.

Updating the Firmware

If a new firmware is available, a message is displayed when the TeraStation boots. You can update the firmware by the following way.

Note: At least 1 GB of free space on the TeraStation is required to update the firmware.

To update from Settings:

1 In Settings, click *Management*.

2 Choose *Update*.

3 Click *Install Update*.

You can also download the firmware from www.buffalotech.com.

Name, Date, Time, and Language

Configure the TeraStation's hostname, date, time, and language as follows.

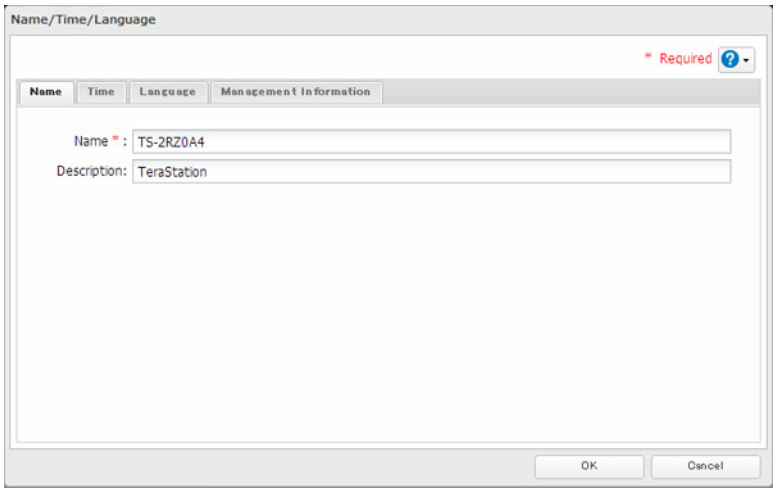
Note: If the TeraStation is being used as an iSCSI hard drive, to change the settings, navigate to *Drives - iSCSI* in Settings and move the iSCSI switch to the position temporarily before changing settings.

1 In Settings, click *Management*.

2 Open *Name/Time/Language*.

3 Click *Edit*.

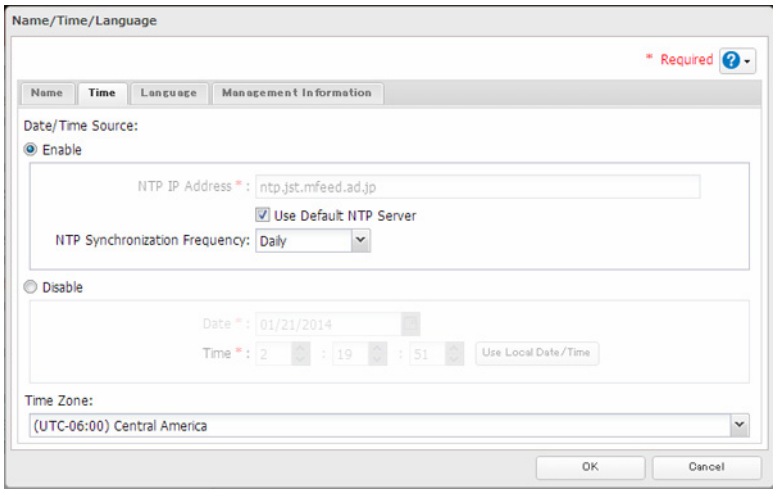
4 Click the *Name* tab, then configure the TeraStation's name and description.



5 Click the *Time* tab.

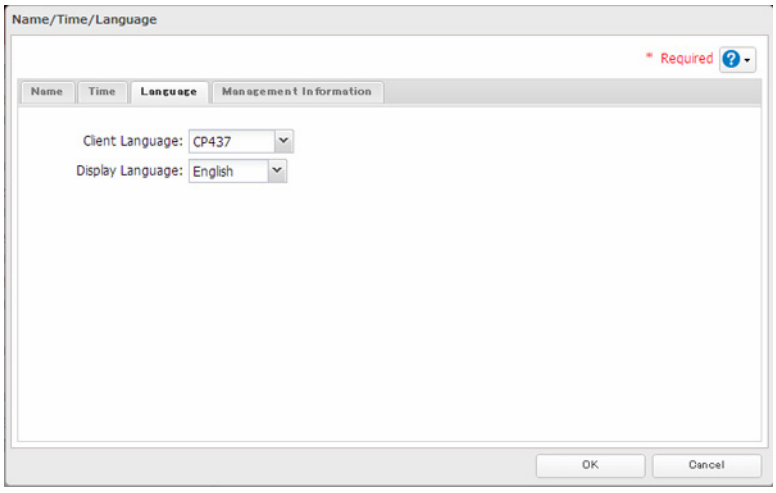
Click *Use Local Date/Time* to use your computer's time settings for the TeraStation.

By default, the TeraStation adjusts its clock automatically by using a default NTP server. This NTP server belongs to Internet Multi Feed Inc. For more information, visit www.jst.mfeed.ad.jp.
To use a different NTP server, select *Name/Time/Language* from *Management*. Click *Time*, then *Edit*. Uncheck "Use Default NTP Server" and enter a new NTP IP address. Click *OK*.
If NTP is not used, enter the time and date manually. Click *Use Local Date/Time* to import the time and date from your computer.
If an NTP server is specified by name instead of IP address, make sure that a DNS server is configured for the TeraStation.



Note: The internal clocks of the TeraStation and other devices on your network may run at slightly different speeds. Over a long period of time your network devices may show somewhat different times, which can cause network problems. If clocks on your network vary by more than 5 minutes it may cause unexpected behavior. For best results, keep all clocks on the network set to the same time by adjusting them regularly, or use an NTP server to correct them all automatically.

6 Click the *Language* tab. Select the language to be used and click *OK*.



Note: This tab changes the language used by the TeraStation for email notifications, DLNA, and other functions. To change the language displayed in Settings, go to Advanced Settings and click *Language* in the menu bar. Choose your desired language from the drop-down menu.

Beep Alerts

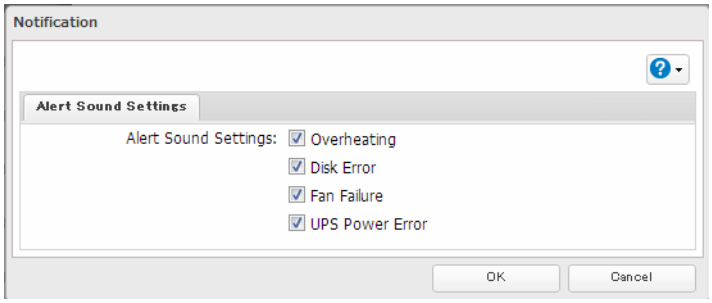
You can set the TeraStation to beep when certain errors occur.

1 In Settings, click *Management*.

2 Select *Notifications*.

3 Click *Edit*.

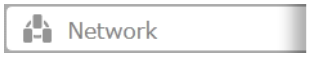
4 Select the conditions to beep the alert, then click *OK*.



Jumbo Frames

If your other network devices support it, you may be able to increase network performance with jumbo frames.

1 In Settings, click *Network*.

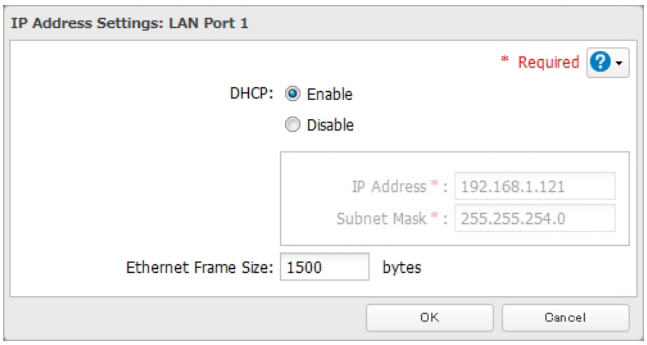


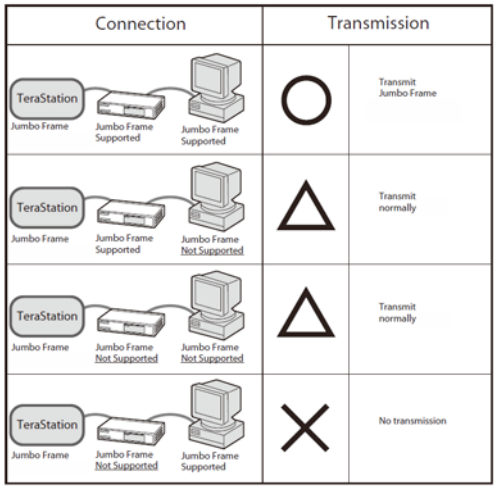
2 Click the icon to the right of "IP Address".

3 Click the LAN port where the jumbo frames will be used.

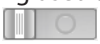
4 Click *Edit*.

5 Enter the desired Ethernet frame size and click *OK*.





Notes:

- To use jumbo frames, your computer's NICs and all switches, hubs, and routers on the network need to support jumbo frames. If any device on the network does not support jumbo frames, use standard frames (1500 bytes) instead.
- Frame sizes smaller than 1500 bytes are not supported.
- The maximum frame size depends on the LAN port: LAN ports 1–4 (10/100 ports) have a maximum frame size of 9216 bytes while LAN ports 5 and 6 (10 Gb expansion ports) have a maximum frame size of 9000 bytes.
- Frame sizes are used as shown. Some systems subtract 18 bytes from the entered value, but the TS7000 does not.
- If the TeraStation is being used as an iSCSI hard drive, to change the settings, navigate to *Drives - iSCSI* and move the iSCSI switch to the  position temporarily before changing network settings.

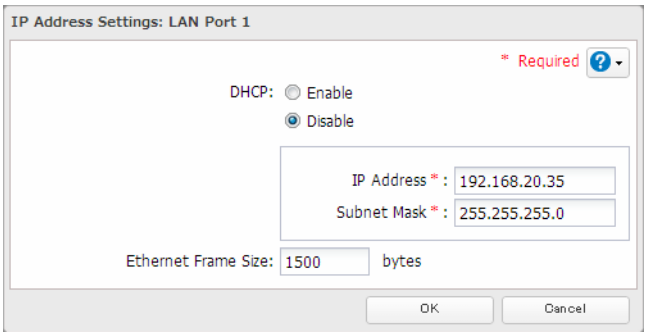
DHCP and IP Address

Normally, the TeraStation's IP address is set automatically from a DHCP server on your network. If you prefer, you can configure the IP address settings manually.

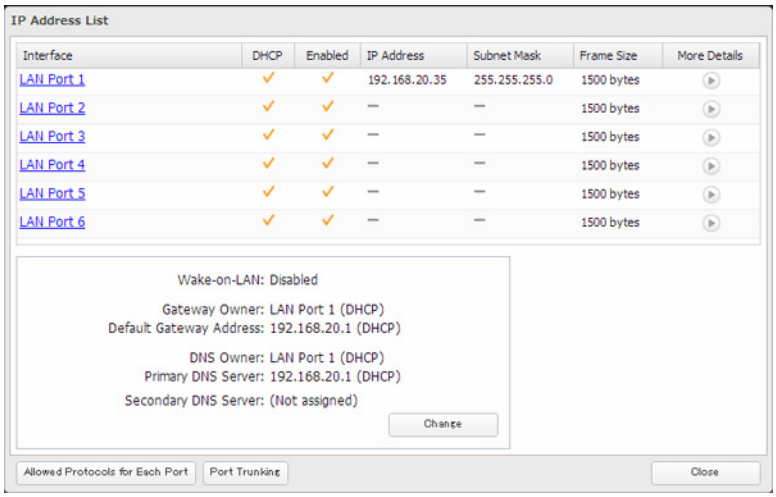
1 Navigate to *Network - IP Address* in Settings.

2 Click on the LAN port whose IP address you want to configure (normally LAN port 1). Click *Edit*.

3 Change the settings as desired and click *OK*.



Notes:



- From the IP address list, other settings are available at the bottom left of the window. Click *Change* to modify the gateway and Wake-on-LAN settings. Click *Allowed Protocols for each Port* to restrict by LAN port which protocols network connections can use. Click *Port Trunking* to combine ports in trunked combinations. See the next section for more on port trunking.
- To use a different default gateway, click *Change* and select the LAN port to modify. This might be useful if you want the default gateway to be assigned by another port besides the default LAN port 1.
- You can also change the TeraStation's IP address from NAS Navigator2. Right-click on your TeraStation's icon and choose *Properties - IP Address*. For Mac OS, hold down the control key and click on the TeraStation's icon. Choose *Configure - IP Address*.
- Do not configure more than one LAN port with the same IP address. This may cause unstable network communication.
- If the TeraStation is being used as an iSCSI hard drive, temporarily disable iSCSI before changing network settings. Navigate to *Drives - iSCSI* in Settings and move the iSCSI switch to the position.

Port Trunking

The multiple Ethernet ports on the TeraStation can provide redundancy and reliability. Several port trunking modes are available:

Trunking Mode	Characteristics
Round-robin*	Network packets are transmitted in sequential order from the first available NIC slave through the last.
Active-backup	Only one NIC slave in the bond is active. A different slave becomes active if and only if the active slave fails.

Trunking Mode	Characteristics
XOR*	Transmits network packets based on [(source MAC address XOR'd with destination MAC address) modulo NIC slave count]. This selects the same NIC slave for each destination MAC address.
Broadcast	Transmits network packets on all slave network interfaces.
Dynamic link aggregation**	Creates aggregation groups that share the network speed and duplex settings. Utilizes all slave network interfaces in the active aggregator group according to the 802.3ad specification.
TLB	The outgoing network packets traffic is distributed according to the current load (relative to the speed) on each network interface slave.
ALB	Includes both balance-tlb and rlb by ARP negotiation.

*A separate intelligent switch that supports EtherChannel or other port trunking is required. Configure the LAN ports on the switch for port trunking first.

**A separate intelligent switch that supports IEEE 802.3ad is required. Configure LACP in the switch first.

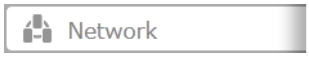
Configuring Port Trunking

1 Use an Ethernet cable to connect the TeraStation's LAN port 1 to a LAN port on the hub.

Notes:

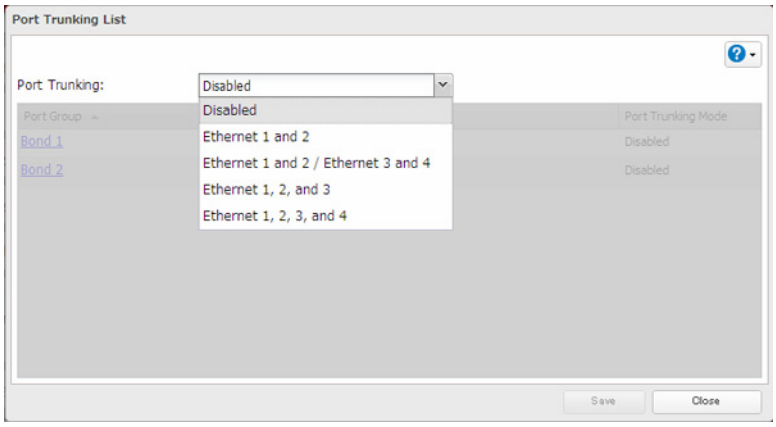
- Port trunking is not supported with ports on expansion cards.
- AFP connection will not be possible if port trunking is enabled. If using port trunking, connect to shares with SMB or FTP instead.
- If the TeraStation is being used as an iSCSI hard drive, disable iSCSI before changing network settings such as port trunking. Navigate to *Drives - iSCSI* in Settings and move the iSCSI switch to the position temporarily.
- Do not connect the second Ethernet cable to the TeraStation yet.
- If using an intelligent switch, configure the LAN ports on the switch first, before connecting to the TeraStation.

2 In Settings, click *Network*.

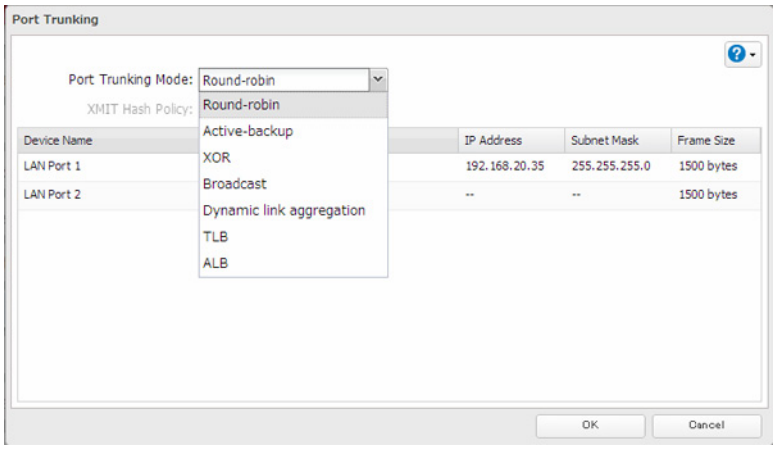


3 Click to the right of "Port Trunking".

4 Choose which ports will be trunked.



5 Select the port trunking mode. Some modes allow the hash policy to be configured as well. Click *OK*.



6 Click *Save*.

7 Connect the second LAN port to the switch or hub.

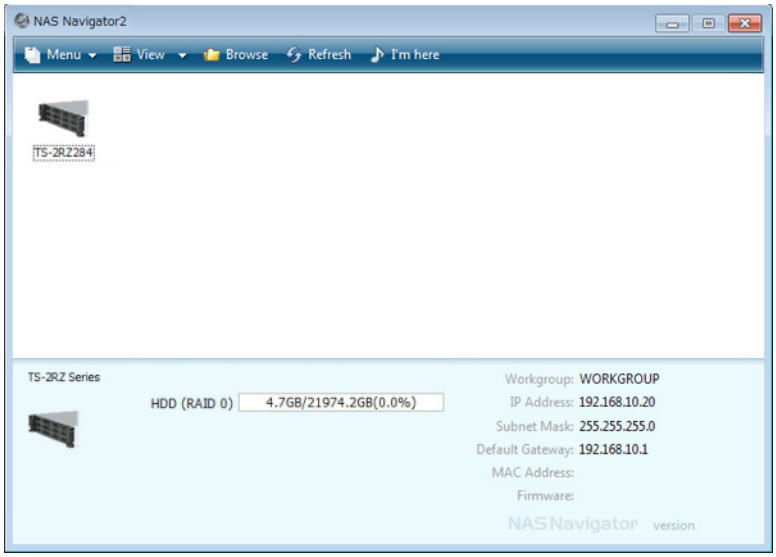
8 Restart the TeraStation before use.

Chapter 11 Utilities

NAS Navigator2 for Windows

NAS Navigator2 is a utility program that makes it easy to display Settings, change the TeraStation's IP address, or check its hard drive. If you installed the TeraStation with the TeraNavigator CD, NAS Navigator2 was installed automatically.

To launch NAS Navigator2, double-click the icon.



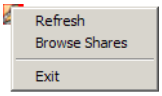
Click your TeraStation's icon to open a share on the TeraStation and display:

- Total capacity
- Capacity in use
- IP address
- Workgroup
- Subnet mask
- Default gateway
- MAC address
- Firmware version

Name		Description
Menu	Map Share*	Assigns the TeraStation's shared folder as a network drive.
	Disconnect Share*	Unmaps the network drive.
	Map All Remote Shares to Drive Letters	Assigns all the TeraStation's shared folders as network drives.
	Create Desktop Shortcut*	Creates a shortcut icon to the shared folder "share" on the desktop.
	Launch NAS Navigator2 on Startup	Launches NAS Navigator2 in the system tray when Windows boots.
	Display Errors	If an error occurs, an error message will pop up from the NAS Navigator2 icon in the system tray.
	Properties*	Opens the selected TeraStation's properties page.
	Close	Closes NAS Navigator2.
View	View	Icons: Displays icon. Details: Displays hostname, product name, workgroup, IP address, subnet mask, and default gateway.
	Sort by	Selects the sort order from following to display when multiple TeraStations are found: Hostname, product name, workgroup, IP address, subnet mask, default gateway
Browse*		Opens the TeraStation's shared folder.
Refresh		Searches for NAS devices on the network again.
I'm here		Causes your TeraStation to beep.
Right-click your device's icon to show these options.	Browse Shares	Opens the TeraStation's shared folder.
	Settings	Opens Settings for the selected TeraStation.
	Properties	Opens the TeraStation's properties page.
	Map Share	Assigns the TeraStation's shared folder as a network drive.
	Disconnect Share	Unmaps the network drive.
	Create Shortcut	Creates a shortcut icon to the shared folder "share" on the desktop.
	I'm here	Causes your TeraStation to beep.

*Click on the TeraStation's icon to display these options.

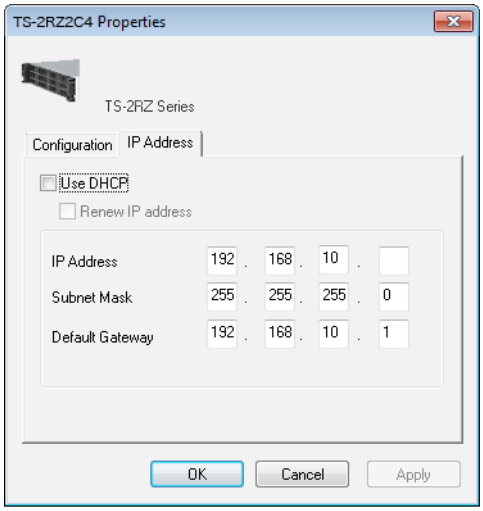
When NAS Navigator2 is minimized, right-click on the NAS Navigator2 icon in the system tray for the following options.



Name		Description
TeraStation Name	Browse Shares	Opens the TeraStation's shared folder.
	Settings	Opens Settings for the selected TeraStation.
	Properties	Opens the TeraStation's properties page.
	Map Share	Assigns the TeraStation's shared folder as a network drive.
	Disconnect Share	Unmaps the network drive.
	Create Shortcut	Creates a shortcut icon to the shared folder "share" on the desktop.
	I'm here	Causes your TeraStation to beep.
Refresh		Refreshes list of NAS devices.
Browse Shares		Displays NAS Navigator2 window.

Exit	Exits NAS Navigator2.

The following tasks may be performed from the TeraStation's properties page.



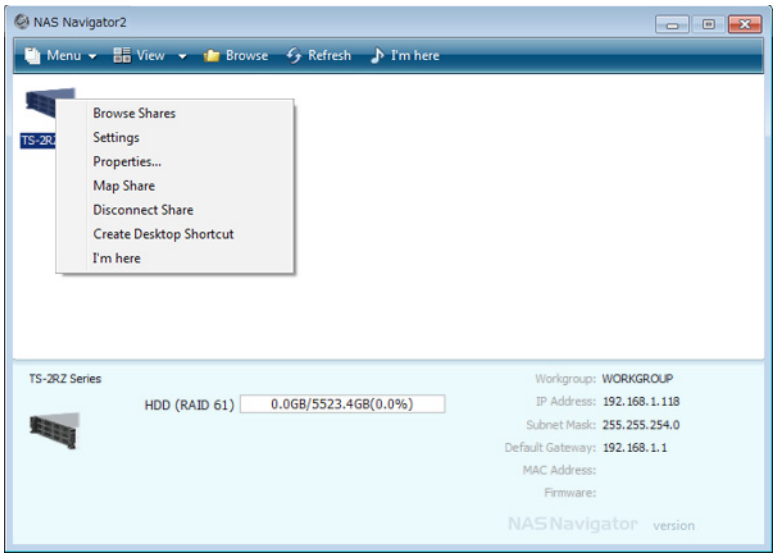
Name	Description
Configuration	Click *Settings* to open the configuration interface.
IP Address	Check *Use DHCP* to assign an IP address from the DHCP server automatically. If there is no DHCP server in the network, you cannot use this function. Check *Renew IP address* to obtain an IP address from the DHCP server. You can manually enter an IP address, subnet mask, and default gateway.

Mount as Network Drive

You can easily map a shared folder as a network drive using NAS Navigator2.

1 Double-click the icon on the desktop.
NAS Navigator2 will start.

2 Right-click on the TeraStation's icon, then click *Map Share*.



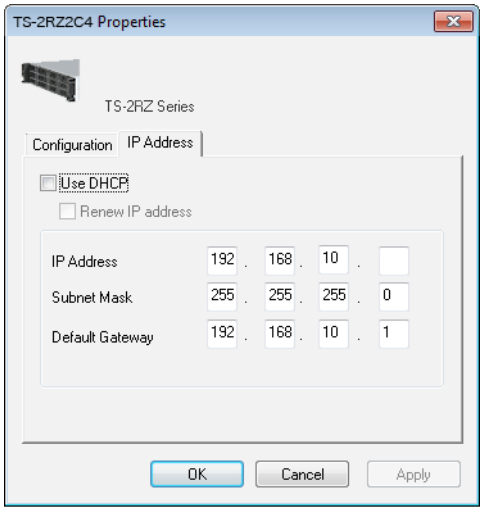
3 An icon for the mapped share will appear in Computer or My Computer. You can use this network drive just like any other hard drive.

Changing the IP Address

1 Double-click the icon on the desktop. NAS Navigator2 will start.

2 Right-click on your TeraStation's icon and choose *Properties - IP Address*.

3 Uncheck "Use DHCP" and enter the desired settings, then click *OK*.



Notes:

- Changing the IP address from NAS Navigator2 is not supported for LAN ports on expansion cards. Navigate to *Network - IP Address* in Settings to change the IP addresses of LAN ports on expansion cards.

- The following IP address are reserved and should not be used. If you configure one of them by accident, initialize all settings.
  Local loopback address: 127.0.0.1, 255.255.255.0
  Network address: 0.0.0.0, 255.255.255.0
  Broadcast address: 255.255.255.255, 255.255.255.0
  The IP address range from 224.0.0.0 to 255.255.255.255

NAS Navigator2 for Mac

NAS Navigator2 is a utility program that makes it easy to display Settings, change the TeraStation's IP address, or check its hard drive.

If you installed the TeraStation with the TeraNavigator CD, NAS Navigator2 was installed automatically. To launch it, click the icon in the Dock.

Click on a TeraStation's icon to display:

- Total capacity
- Used capacity
- Workgroup
- IP address
- Subnet mask
- Default gateway
- MAC address
- Firmware version

Double-click it to open a share on the TeraStation.

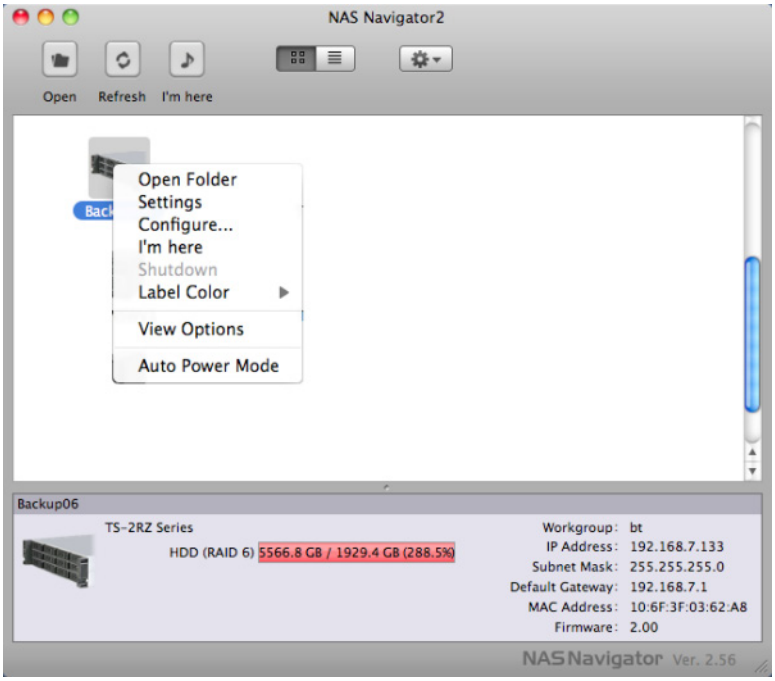
Name		Description
Open		Opens the default shared folder for a selected TeraStation.
Refresh		Searches for NAS devices on the network again.
I'm here		Causes your TeraStation to beep.
Settings		Opens Settings for the selected TeraStation.
Configure		Opens a window that lets you configure the NAS's IP address or open Settings.
Label Color		Selects the color of the name displayed below the icon.
View Options		Lets you choose icon size, position, and view mode.
Auto Power Mode		Auto power mode can turn supported TeraStations and LinkStations on the network on and off automatically.
To display these options, hold down the control key and select your TeraStation's icon.	Open Folder	Opens the TeraStation's shared folder.
	Settings	Opens Settings for the selected TeraStation.
	Configure	Opens a window that lets you change the NAS's IP address or open Settings.
	I'm here	Causes your TeraStation to beep.
	Label Color	Selects the color of the name displayed below the icon.

Mounting as a Network Drive

You can map the shared folder as a network drive using NAS Navigator2 on Mac OS.

1 Click the icon in the Dock. NAS Navigator2 will start.

2 Click the TeraStation icon while holding down the control key, then select *Open Folder*. Enter a username and password with the rights to access the shared folder.



3 Select the shared folder that you want to mount, then click *OK*.

4 The shared folder is now mounted as a network drive.

Changing the IP Address

1 Click the icon in the Dock. NAS Navigator2 will start.

2 Click the TeraStation icon while holding down the control key, then choose *Configure... - IP Address*.

3 Uncheck "Use DHCP" and enter the desired settings, then click *OK*.

Notes:

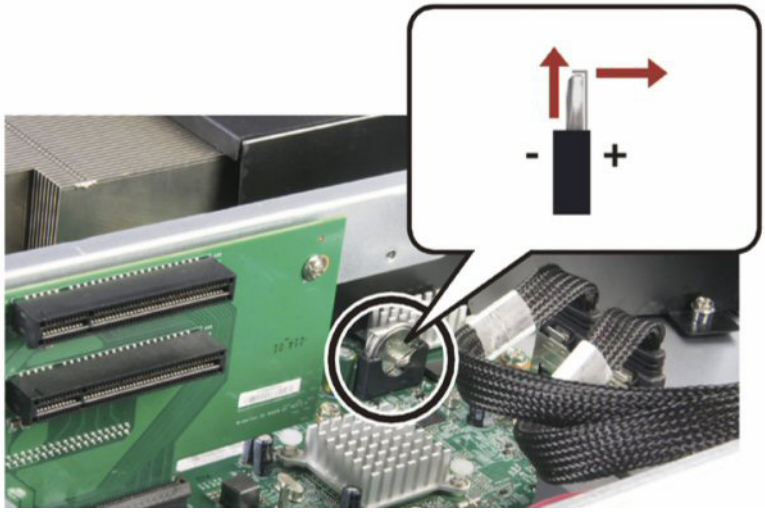
- Changing the IP address from NAS Navigator2 is not supported for LAN ports on expansion cards. Navigate to *Network - IP Address* in Settings to change the IP addresses of LAN ports on expansion cards.
- The following IP address are reserved and should not be used. If you configure one of them by accident, initialize all settings.
  Local loopback address: 127.0.0.1, 255.255.255.0
  Network address: 0.0.0.0, 255.255.255.0
  Broadcast address: 255.255.255.255, 255.255.255.0
  The IP address range from 224.0.0.0 to 255.255.255.255

Chapter 12 Appendix

Replacing the Battery

After approximately 5 years, the CR2032 battery on the motherboard will need to be replaced. Use only the correct CR2032 3 Volt lithium battery.

Move the lock to the side to release the battery and pull it straight up to remove. Be extremely careful to put the replacement battery in correctly! If it is inserted with reverse polarity, the TeraStation will be damaged.



Adding a NIC

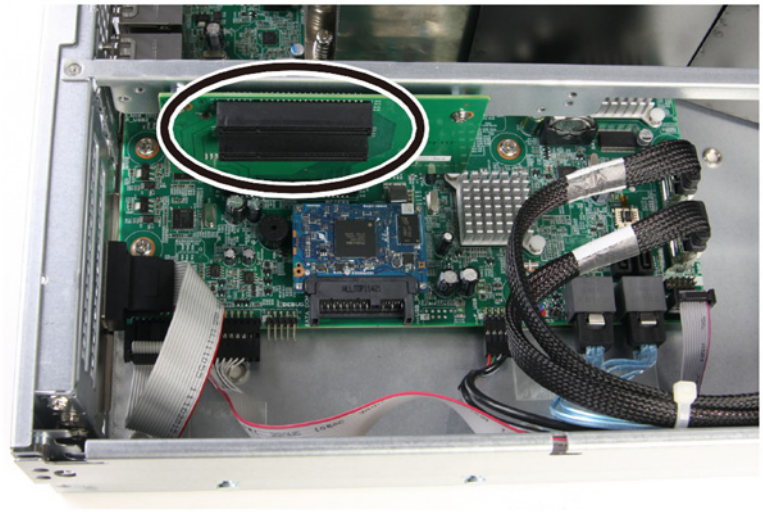
The TeraStation includes 4 gigabit Ethernet ports as standard, but you may add expansion cards for one or two additional 10-gigabit Ethernet ports. Follow the steps below to install a network expansion card in your TeraStation.

1 Turn off the TeraStation and unplug its power cord(s).

2 Open the cover.

3 Remove the screw and bracket from the lower slot.

4 Insert the expansion card in the lower slot (not the upper slot).



5 Replace the screw.

6 Find and connect the power connector.

7 Close the cover.

8 Reconnect the power cords.

Notes:

- Port trunking is not supported with ports on expansion cards.
- You may have up to 6 total NIC ports in the TeraStation. Supported configurations include adding one dual-port expansion card or 2 single-port expansion cards.
- Currently, the TeraStation supports the following NICs:

Emulex

OCe11102-N (dual-port)
OCe11102-I (dual-port)
OCe11102-F (dual-port)

Intel

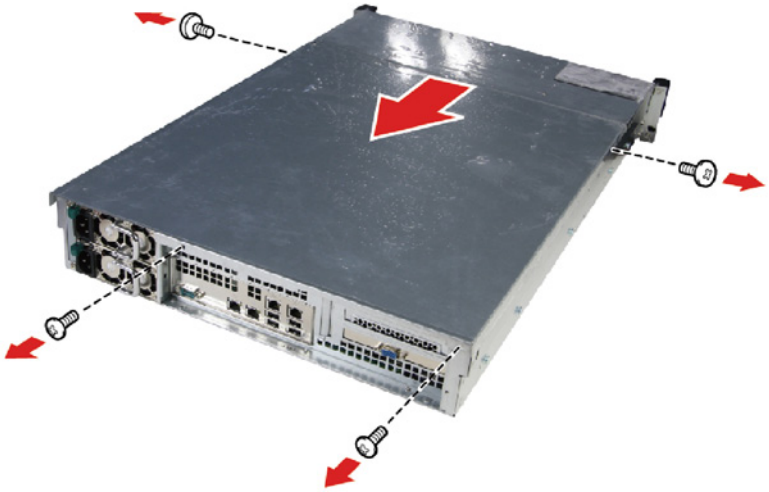
X540T2 (dual-port)
E10G42BTDA (dual-port)
E10G41BFSR (single-port)
E10G42BFSR (dual-port)
E10G41 AT2 (single-port)
See our website for an updated list of compatible NICs.

Adding a USB 3.0 Card

To install a USB 3.0 card in your TeraStation, follow the steps below.

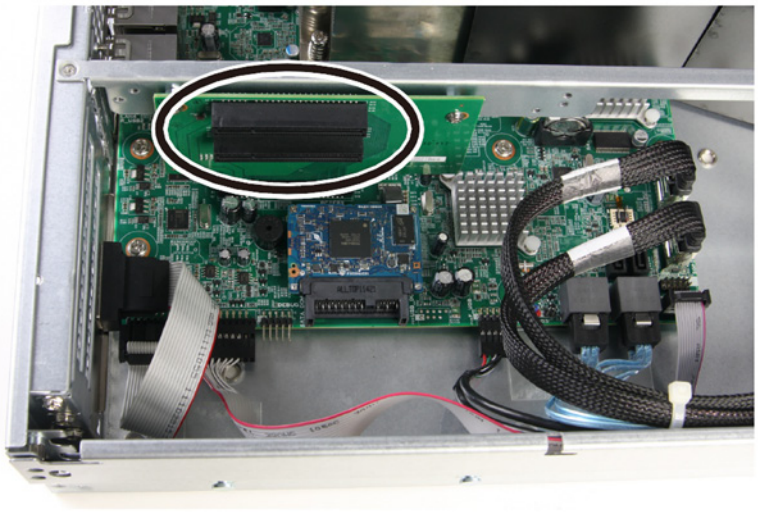
1 Turn off the TeraStation and unplug its power cord(s).

2 Open the cover.



3 Remove the screw and bracket from an open slot.

4 Insert the USB 3.0 card in the open slot.



5 Replace the screw.

6 Find and connect the power connector.

7 Close the cover.

8 Reconnect the power cords.

Errors

Error codes can be viewed in *Management - Notifications*.

Error	Description	Corrective Action
BOOT FAIL	Hard drive not found.	Contact Buffalo technical support for assistance.
SYSTEM Error E04 Can't Load Krnl!	The firmware is corrupted.	Contact Buffalo technical support for assistance.
UPS E10 Dependent Mode	The TeraStation is running on the UPS battery due to a power outage. The system will now be shut down safely.	Check that power is being supplied to the UPS, and if there are no problems, turn on the TeraStation.
SYSTEM I10 TOO HOT !	A rise in the system temperature may have exceeded the allowable safety value.	Move the TeraStation to a cool location. Do not place objects in the area around the TeraStation.
SYSTEM Error E11 Fan Failure	An error occurred in the fan speed.	Check that no foreign objects or dust are clogging the fan. If any foreign objects or dust are found, use a pair of tweezers, air duster, or other tool to remove them. If the error is displayed again, contact Buffalo technical support for assistance.
SYSTEM Error E12 Cooling Failure	A rise in the system temperature may have exceeded the allowable safety value.	Do not place objects in the area around the TeraStation. Also, move the TeraStation to a cool location.

RAID Arrayx E14 Can't Mount	RAID array X cannot be mounted.	Run the RAID array disk check in Settings.
HDx Error E16 HDx Not Found	Unable to find hard drive X.	Hard drive X may be disconnected or may have failed. After shutting down, reinstall the hard drive.
HDx Error E22 HDx Can't Mount	Mounting of hard drive X failed.	Format the hard drive. After formatting, if the error still appears after rebooting, replace the hard drive. If the error is displayed again, contact Buffalo technical support for assistance.
FailOver E27 LostBackupTarget	Unable to find the backup TeraStation.	In the main TeraStation's settings, navigate to *Backup - Failover* to reconfigure the backup TeraStation for failover.
HDx Broken E30 Replace the DISK	An error occurred, so hard drive X was removed from the RAID array.	Replace hard drive X.
E31	Power supply error (level 1)	Make sure that the AC cable is connected properly. If the power supply has failed, E32 will be displayed within a few minutes. If E31 is still displayed after 5 minutes, contact Buffalo technical support for assistance.
E32	Power supply error (level 2)	Make sure that the AC cable is connected properly. If the power status LED is blinking or glowing red, replace the power supply with a new Buffalo OP-PU-2RZ.

Status

After you change settings or format a hard drive, the current status is displayed on NAS Navigator2 or clicking in Settings.

Message	Description	Corrective Action
HDx Warning I11 Bad Sectors	The bad sectors in hard drive x may have reached a dangerous level.	Replace hard drive x.
Operation I12 DEGRADE MODE	Operating in degraded mode.	-
RAID I13 ARRAYxFormatting	Formatting RAID array x.	-
RAID I14 ARRAYx Checking	Checking RAID array x.	-
RAID I15 ARRAYx Scanning	Examining the error status of RAID array x. **Note:** Transfer speeds are slower during the examination process.	-
RAID I16 ARRAYx Creating	Creating RAID array x.	-
RAID I17 ARRAYx Resyncing	Resynchronizing RAID array x. **Note:** Transfer speeds are slower during resynchronization.	-

RAID I18 ARRAYx Rebuilding	Rebuilding RAID array x. **Note:** Transfer speeds are slower during the rebuilding process.	-
RAID I19 ARRAYx 0 Filling	Writing 0s to RAID array x, erasing all data.	-
RAID I20 DISKx Formatting	Formatting hard drive x.	-
RAID I21 DISKx Checking	Checking hard drive x.	-
RAID I22 DISKx 0 Filling	Erasing the data for hard drive x.	-
SYSTEM I25 F/WUPDATING	Updating the TeraStation firmware. **Note:** Do not turn off the power during the updating process.	-
Web Setting I26 Initializing	Initializing all settings.	-
USB Diskx I27 Checking	Checking USB hard drive x.	-
USB Diskx I28 Formatting	Formatting USB hard drive x.	-
Set From Web I32 New Diskx ready	Displayed after replacing hard drive x when the RAID needs to be rebuilt in Settings or formatting is necessary.	In Settings, either rebuild the RAID array or format the hard drive.
Replication I33 ReplicateFailure	An error occurred in replication, or synchronization between the main TeraStation and the backup TeraStation failed during failover configuration.	In Settings, navigate to *Backup - Replication* and choose "Resync" to execute resynchronization. If the error is displayed again, contact Buffalo technical support for assistance.
Cartridgex I35 Location error	A hard drive set as a media cartridge has been installed in the drive x slot.	Connect to the slot that was set as a media cartridge.
Cartridgex I36 Decryption error	Media cartridge cannot be decrypted. The media cartridge may have been encrypted by a TeraStation other than this product.	Connect to the TeraStation that performed encryption to decrypt.
Recovery I37 SystemRecovering	System recovery in progress.	-
Recovery I38 RecoveryFinished	System recovery is complete.	-
Recovery I40 DataWillDeleted	Beginning recovery. All data in the drive 1 will be deleted.	-
Recovery I42 Preparing	Preparing to start the recovery process.	-
Recovery I43 Unsupported HW	The TeraStation was started from the USB recovery device, but the system cannot be recovered from this USB recovery device.	-
Recovery I44 Disk1 not found	Recovery from the USB recovery device was initiated, but the drive 1 was not detected.	Make sure that Disk 1 is present and fully inserted in its slot.

Recovery I45 Recovery Failed	Recovery failed.	-
RAID ARRAY I46 RMM+Processing	Data migration or conversion (RAID migration) is in progress.	Do not turn off the TeraStation power.
SYSTEM I47 Don't Power Off		
FailOver I49 LostMainTarget	The main TeraStation in the failover configuration cannot be found.	Make sure that the main TeraStation is on, working, and connected to the network.
FailOver I50 Maintenance mode	Failover maintenance is in progress.	Do not turn off the TeraStation power.
FailOver I51 Initializing	Initializing the failover configuration.	Do not turn off the TeraStation power.
New Firmware I52 Available	A new firmware version has been released.	Update the firmware.
BackupTask xx I54 Backup Failure	xxth backup task failed.	Make sure that the xxth backup task is configured correctly. Make sure that the NAS is not in standby mode. If the backup task still fails, check the network, backup source, and backup destination.
Recovery I55 RecoveryAuthFail	Authentication during recovery of settings failed.	Settings can only be restored for the TeraStation whose settings were originally saved. To restore settings, insert the USB memory device, move the Boot Mode switch on the rear of the TeraStation to the USB position, and restart the TeraStation. Or, settings can be restored in Settings with the TeraStation powered on.
Surveillance I56 Lack of License	There are not enough surveillance camera server licenses.	Purchase and register an additional license.
Surveillance I57 No free space	There is not enough space to save additional surveillance video.	Delete or move some of the stored video.
Surveillance I58 Recording Failure	Video not recorded.	Check your settings. Also, use the utilities provided with your camera to check that the camera is operating correctly.

Default Settings

Administrator's Name	admin
Password	password
Shared Folders	"share" (with recycle bin enabled by default).
DHCP Client	Normally, the TeraStation will get its IP address automatically from a DHCP server on the network. If no DHCP server is available, then an IP address will be assigned as follows: IP Address: 169.254.xxx.xxx (xxx is assigned randomly when booting the TeraStation.) Subnet Mask: 255.255.0.0
Registered Groups	"hdusers", "admin", and "guest" You cannot edit or delete these default groups.

Microsoft Network Group Name	WORKGROUP
Ethernet Frame Size	1500 bytes (plus 14 bytes of header and 4 bytes of FCS)
AFP	Enabled
FTP	Disabled
NTP	Enabled
Print Server	Enabled
WebAccess	Disabled
Time Machine	Disabled
TeraSearch	Disabled
RAID Mode	The default RAID mode for 12-drive TeraStations is RAID 6. 4-drive models come in RAID 5 by default.

Specifications

Check www.buffalotech.com for information about the latest products and specifications.

LAN Port	Interface	IEEE 802.3ab (1000BASE-T) IEEE 802.3u (100BASE-TX) IEEE 802.3 (10BASE-T)
	Transfer speed	1000 Mbps Full duplex (auto-negotiation) 100 Mbps Full duplex/Half duplex (auto-negotiation) 10 Mbps Full duplex/Half duplex (auto-negotiation)
	Number of Ports	4 ports (Auto-MDIX)
	Connector Type	RJ-45 8-pin
	Protocol	TCP/IP
	Access Method	CSMA/CD
	File Sharing	SMB/CIFS, AFP, FTP, SFTP, NFS
	Management	HTTP/HTTPS
	Jumbo Frames	1500–9216 (10/100 ports) 1500–9000 (10 Gb ports) (not Including 14 bytes of header and 4 bytes of FCS)
USB Port	USB 2.0 Port (Series A) x 6 **Note:** Supported USB devices include Buffalo USB hard drives, USB UPS devices, and printers.	
UPS Port	UPS Port (D-SUB 9 pin (Male)) x 1 **Note:** Compatible UPSs are manufactured by Omron and APC.	
Internal Hard Drive	If a hard drive in the TeraStation malfunctions, replace it with a Buffalo OP-HDZS series or OP-HDZH series drive of the same capacity, available from *www.buffalotech.com*.	
Power Supply	2x (redundant) AC 100–240 V, 50/60 Hz	
Power Consumption	Max 220 W	
Weight	25 kg (55.1 lbs.)	
Dimensions (W x H x D)	480 x 88 x 736 mm; 18.9 x 3.5 x 29 in (excluding protruding parts)	
Operating Environment	Temperature: 5–35°C; 41–95° F Environment Humidity: 20–80% (no condensation)	
Compatibility	Windows and Mac computers with Ethernet interface. **Note:** The TeraStation requires an Ethernet connection with your computer for operation. It cannot be connected via USB.	

Supported OS	Windows 8.1*, Windows 8*, Windows 7*, Windows Vista*, Windows XP*, Windows XP Media Center Edition (2004 or 2005), Windows Server 2012 R2, Windows Server 2012, Windows Server 2008 R2, Windows Server 2008, Windows Server 2003 R2, Windows Server 2003 OS X 10.9, 10.8, 10.7, 10.6, 10.5, 10.4 *32-bit and 64-bit

Compliance Information

The TeraStation uses GPL code. For source code, visit http://opensource.buffalo.jp

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Marking Statement

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Environmental Information

- The equipment that you have purchased required the extraction and use of natural resources for its production.
- The equipment may contain hazardous substances that could impact health and the environment.
- In order to avoid the dissemination of those substances in our environment and to diminish the load on natural resources, we encourage you to use the appropriate take-back systems.
- The take-back systems will reuse or recycle most of the materials of your end of life equipment appropriately.
- The crossed-out wheeled bin symbol invites you to use those systems.
- If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

KC

기종별	사 용 자 안 내 문

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BSMI

警告使用者:

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

CCC

警告

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设备的最高使用室内环境温度: 35° C

仅适用于海拔 2000M 以下地区安全使用。

断开装置为电源软线上的插头。插座应当装在设备的附近，而且应当便于触及到。电池警告语

1.电池不得暴露。

2.使用型号不正确的电池可能导致爆炸。

Models

TS-2RZS04T04D, TS-2RZS08T04D, TS-2RZS12T12D, TS-2RZS24T12D, TS-2RZS36T12D

TS-2RZH12T12D, TS-2RZH24T12D, TS-2RZH36T12D, TS-2RZH48T12D, TS-2RZH72T12D,